Rubber Journal and International Plastics

UNIVERSITY OF MICHIGAN
OCT 6 - 1959
ENGINEERING LIBRARY

137 NO. 5 SEPTEMBER 12 1959 Price 1s. Weekly

FACTICE

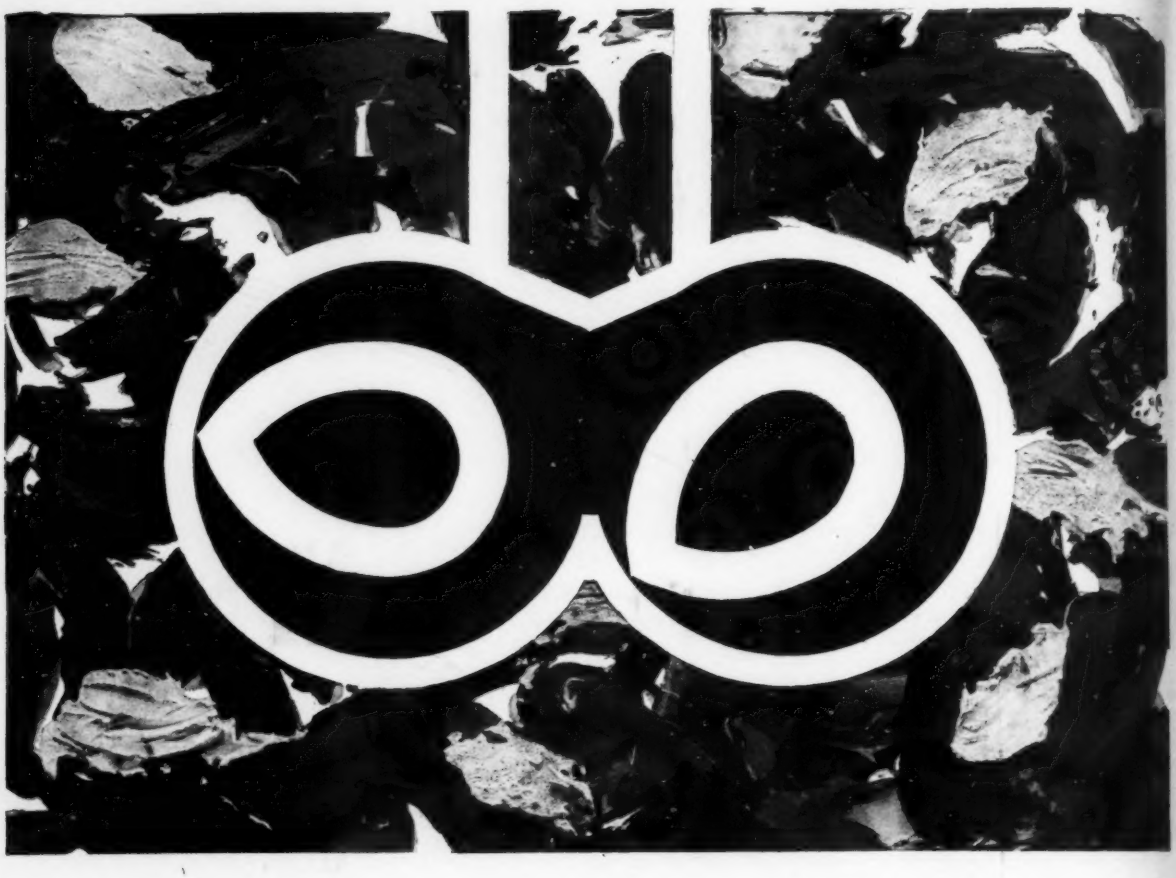
DARK
WHITBRO
WHITE

GRADES TO MEET ALL REQUIREMENTS

The finest non-thermoplastic softener for natural and synthetic rubber. Unique for the smooth finish and supple handle it gives to moulded, calendered, extruded, dipped and proofed goods.

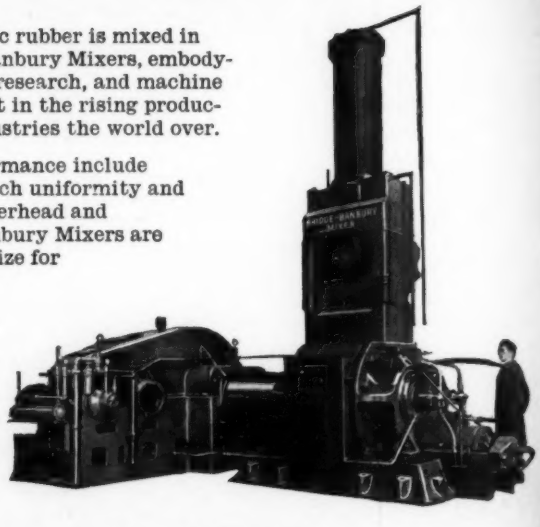
ANCHOR CHEMICAL CO LTD · MANCHESTER 11

London Office: Grand Buildings, Trafalgar Square, W.C.2
Scottish Agents: J. & G. Hardie & Co. Ltd., 178 Fulton Street, Glasgow, W.3
American Liaison and Service Branch: British Anchor Chemical Corporation, 366 Madison Avenue, New York 17, N.Y.



No less than 85% of the world's natural and synthetic rubber is mixed in Banbury Mixers.* Small wonder then, that Bridge-Banbury Mixers, embodying more than a generation of practical experience, research, and machine design, continue to play an almost indispensible part in the rising productivity of the ever-expanding rubber and plastics industries the world over.

Indisputable claims for Bridge Banbury Mixer performance include optimum dispersion, speedier mixing, consistent batch uniformity and quality, increased production and a lower labour, overhead and maintenance cost per unit of production. Bridge Banbury Mixers are designed for round-the-clock operation. There is a size for every production requirement. Ancillary machinery matched to deal with the increased output and further streamline the production flow is available. **Bridge-Banbury Automation is continuous production.**



Fully detailed technical information is freely available on request.

* *Banbury is a registered trade mark in many countries throughout the world.*

* BRIDGE - BANBURY MIXERS *

. . . . ACCLAIMED AS THE ULTIMATE IN MIXER EFFICIENCY

BRIDGE

DAVID BRIDGE & CO. LTD. CASTLETON, ROCHDALE, LANCASHIRE.

In technical association with Farrel-Birmingham Co. Inc. Ansonia, Conn. U.S.A.

'Phone Castleton, Rochdale, 57216 'Grams: Coupling. Phone Castleton Lancs.

London Office:
Broughton House, 6, 7, 8 Sackville St. Piccadilly, W.1. 'Phone Regent 7480. Grams & Cables: Ederaceo, Piccy, London.

Editorial Director
JOHN D. COPEMAN

Editor
RICHARD ROWLAND

Consultant Editor
H. J. STERN
B.Sc., Ph.D., F.R.I.C., F.I.R.I.

Advertising Director
C. B. COPEMAN

Advertising Manager
A. S. KINGHAM

UK Area Representatives

M. J. Whelan, London

R. P. Finucane, Eastern Counties, Huntingdonshire, Hertfordshire, Bedfordshire, Buckinghamshire, Northamptonshire, Kent, Surrey and Sussex (Operating from London Office)

L. Quy, South and West of England and South Wales (Operating from London Office)

A. J. Legg, 55 Lee Lane West, Horsforth, Nr. Leeds. Tel. No. Horsforth 3845, North-East England, Lancashire, Yorkshire, Nottinghamshire, Lincolnshire and Derbyshire

W. Brown, 13 Allerton Road, Southport, Lancashire. Tel. No. Southport 5121, Scotland

E. A. Daniel, 'Brockenhurst,' 18 Thornhill Park, Streetly, Sutton Coldfield, Warwickshire. Tel. No. Streetly 1485, Midlands (excluding Staffordshire North of the A.5), Cheshire and North Wales

E. Burgess, 4 Kelvin Street, Maybank, Newcastle-under-Lyme. Phone 64678, Staffordshire North of the A.5

Foreign Representatives :

R. K. Larke, 7 Rue Pilaudo, Asnieres (Seine), France. Tel. No. Gresillons 42.24

G. Arnold Teesing, Rubensstraat 68, Amsterdam, Z (Netherlands). Tel. No. 727913

Albert Milhado & Co., G.m.b.H., Konigsallee 33, Dusseldorf, Germany, and Pompstraat 2, Antwerp, Belgium

Massimo Fano, Via V. Monti 14, Milan, Italy. Tel. No. Milan 808135

Rubber Journal and International Plastics

Volume 137 **Price 1s. Post free 1s. 4d.** **No. 5**

IN ITS 76th YEAR

September 12 1959

Editorial

NOTES OF THE WEEK 159

Articles and News

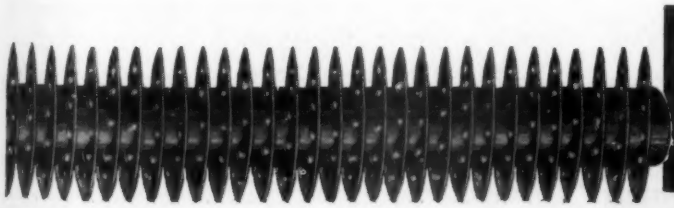
SYNTHETIC RUBBERS IN CABLES—4 161
GOODYEAR TERRA-TYRE 164
THE ANALYSIS OF PLASTICS—3 166
DUSSELDORF PLASTICS EXHIBITION 179
IRI NEWS 180

Features

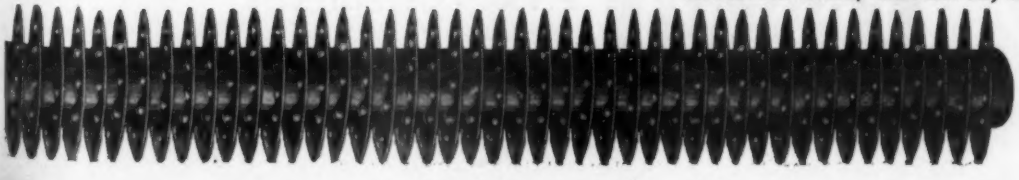
RUBBER AND PLASTICS NEWS 168
VIEWS AND REVIEWS 172
QUESTIONS CORNER 174
MEN AND MATTERS 176
REVIEW 182
PLANTATION COMMENTARY 183
RUBBER STATISTICS 186
INDUSTRY INTELLIGENCE 188

Classified Advertisements . . . 191 Advertisers Index . . . 196

MACLAREN HOUSE, 131 GREAT SUFFOLK STREET, LONDON, S.E.1
Grams : 'Buns, Souphone, London' Phone : HOP 5712
Annual Subscription, including Postage: United Kingdom and Oversea, £2 15s.; Index (half-yearly), 10s. per annum extra. Published weekly. Registered at GPO as a Newspaper. Registered for Transmission by Canadian Magazine Post. Entered as Second Class matter at Post Office, Boston, Mass, USA, under the Act of March 3, 1879 (Sec. 397 P. L and R.)



HUNT
Gilled Tubes & Heaters
HUNT HEAT EXCHANGERS LTD.
GRIMSHAW LANE, MIDDLETON, MANCHESTER



Hey there, Mr Pennysaver!

Mr. Pennysaver is a familiar figure in the business world. He is the man who is always trying to find cheaper basic materials, because he knows that these mean lower production costs and hence bigger profits right down the line.

The danger is, that by shopping in the bargain basement, he may lose out on quality.

But if it's P.V.C. compounds and sheeting Mr. Pennysaver is looking for, he can avoid this danger quite simply—he can come to see us at Phoenix.

Here Mr. Pennysaver will find whatever he wants—P.V.C. compounds, sheeting and tapes of all kinds for all purposes. What is even more to his liking, he will be getting top quality materials while paying the lowest price.

So welcome to Phoenix, Mr. Pennysaver: welcome all who, like him, are interested in cutting costs without cutting quality.

PHOENIX **P.V.C. COMPOUNDS**

Phœnix Rubber Co Ltd, Slough, Buckinghamshire. Telephone: Slough 22307/9

CA339

NOTES of the WEEK

Bright Futures

IN its annual report for 1958, the Natural Rubber Development Board forecasts a bright future for natural rubber. This is, of course, right and proper but a warning is added that 'vigilance and energy' must continue to be applied to its development if this is to be achieved in face of the challenge of synthetic rubber. The report (which will be reviewed in next week's issue of the Journal) records also encouraging progress in rubberized road projects. On the other side of the Atlantic, Mr Bugbee, president of the Natural Rubber Bureau, stated last weekend that US consumption of rubber—of all sorts—would set new records in the last half of 1959. At the same time, Mr Bugbee described as 'disturbing' the July use of synthetic, which was 66.36% against the normal 65—35% ratio for synthetic/natural. He pointed also to the export of synthetic from the US, the July 1959 figure of 28,083 being about double the 14,730 for July 1958. Mr Bugbee said that the high price of natural had undoubtedly contributed to both the rise in the synthetic ratio and the rise in synthetic exports from US. Back in London at the start of the week the price of spot rubber rose to 2s. 9d. a lb., the highest level since early 1956. Opinion among some London rubber dealers is that natural rubber will stay at this level for the remainder of the year. On the synthetic side in the UK, it is interesting to note that the increase in consumption recorded during the first half of the year is being more than maintained. These figures illustrate merely what has been said on every hand for a long time, that is that world demand for rubber is increasing. The swing to greater use of synthetic is not unexpected and, as has been pointed out in London and New York, does not mean that natural is losing ground. Factors to be considered are the buying of natural by Russia and China and the uncertain positions in Indonesia and Laos.

Trade and Telling

A WORD or two was said here last week about the use of rubber for springs and couplings in the new BMC baby cars. This particular use of rubber—well advertised throughout the country—can have also an important effect in quite another field, that of publicity. It must remind the public in general of the existence of one of the country's major industries—rubber manufacture. By and large, this is either little heard of or taken for granted. And this in spite of the fact that the greater part of many people's lives in this country is spent, literally, on rubber: walking, driving, riding, sleeping, sitting, reclining, on 'sea-beds,' crossing the oceans or the air and returning to land from the latter element, a feat otherwise impossible. For although, at a pinch, ground traffic could move on steel-tyred wooden wheels, the imagination boggles at the idea of a Comet IV landing on them. The rubber industry, presently more virile and adventurous than ever before, has had a splendid past and can look forward to an exciting future. The story is a tremendous one; right from plantation or synthetic rubber plant through to the manifold uses: from inflatable life rafts with their already wonderful record to the more spectacular rocket fuels and on in some form or another to manned space satellites or back, even, to the humble hot water bottle. From every angle the story is indeed a tremendous one. It should be told, graphically, to the man and woman in the street.

A Further Leap

A STATEMENT issued by the association of the German chemical industry recently, with regard to the use of plastics in house building, said that price considerations and material suitability apart, the industry would not be able to supply in sufficient quantity plastics building materials for houses made completely from plastics. In Germany, UK and other countries, building components made from plastics, guttering, down-pipes, wall panels, doors and roofing materials among them, are finding increasing use. Window frames made entirely of plastics have been tested satisfactorily in a variety of climates (an informative article on the newest of these appeared in RJIP for August 29). Other frames are made of steel or wood covered with plastics materials. The potential in the field of house building alone is so vast and there are so many more avenues for expansion that the industry may well be on the eve of a further great leap forward. If there has been a quietish spell it can be looked at as no more than consolidation.

All Out

THE General Election scheduled for October 8 will not affect most people any more than such events usually do. The odd political meeting may prove more attractive as a means of entertainment than some of the low-level stuff on TV and there are forms to be filled in. However, the election will affect the Plastics Institute's reception and conversazione scheduled for October 9, which is to be postponed. Reason for this is that as there are no members there can be none to sponsor such an occasion, as is essential. It is interesting to note, in passing, that when there is no parliament, there is no one in the Palace of Westminster, except, of course, the members of the staff. It is a case of all out but not necessarily of all change.

NEWS *Briefs*

BURMESE RUBBER — MALAYAN DEVELOPMENT
FRANCO/SWISS AGREEMENT — US MELAMINE
FACTORY PLANNED — DRACONE IN SERVICE

●**United States**—Original equipment truck tyre prices are scheduled to rise by 3 to 5% on October 1, truck manufacturers have been notified by the major rubber companies. The increases are being attributed to the rising cost of natural rubber which is used heavily in truck tyres, and to the wage and fringe benefit increases in the rubber industry this year.

●**Guatemala**—A loan of 5m. Quetzals (at 5½% for 12 years) has been granted to Guatemala by the United States Development Loan Fund to foster rubber production. The loan is intended to assist in the establishment of about 80,000 acres of rubber plantations on the Pacific coast. When in full production these would produce some 40,000 tons of rubber annually and give employment to 17,000 workers.

●**Burma**—In order to encourage rubber cultivation, it is reported from Rangoon, the Burmese Agricultural and Rural Development Corporation is to sell to cultivators about 800,000 rubber plants at 4½d. each and chemical fertilizer at half its usual cost.

●**Liberia**—The total value of exports from Liberia to the UK during 1958 was US$162,088 compared with US$78,878 in 1957.

●**United States**—New contracts providing an increase of 10 cents an hour for workers have been signed by US Rubber, B. F. Goodrich and Firestone with the United Rubber Workers' Union. The wage rise, it was stated, takes effect from last Monday. These agreements followed a similar one between the Union and Goodyear concluded earlier this week.

●**France** — The French Moniteur Officiel du Commerce et de l'Industrie of May 2 1959 published the extension of the Franco/Swiss trade agreement which was due to expire on June 30 1959 for a further period of six months until December 30 1959. Swiss exports to France include Thermo plastics materials and other artificial plastics materials, 840. Articles of plastics materials including plastic joints, viscose sponges and plastic foam articles, 540. Articles of vulcanized but not hard rubber, 80. Footwear with outside soles and uppers of rubber, 300. Equipment for the rubber and plastics industries, 2,400. The figures represent the annual quota in thousands of Swiss francs.

●**Czechoslovakia**—Lists of goods to be exchanged under the agreement between the Benelux countries and Czechoslovakia in the year from April 1 1959, have now been published in Belgium. Included in the importation of Czechoslovak products into the Benelux countries are the following: Pneumatic mattresses, 15,000 units—no value given; rubber footwear, 375,000 pairs—no value given; asbestos cement products, 575,000 florins. Exportation of products of the Benelux countries to Czechoslovakia include synthetic resins, 100 tons; sundry articles of rubber including driving belts, 120; pneumatic tyres, 1,000.

●**France**—Text of a new trade agreeagreement between France and Bulgaria was published on August 15 valid to July 31 1960. Goods to be exchanged include, from France to Bulgaria, plastic materials, cellulose films, celluloid, polyvinyl chloride, phenoplasts, etc., to value of Fcs.125m.

●**United Kingdom**—The first dracone flexible oil barge to enter regular service has begun deliveries between the Esso Refinery at Fawley and Esso distribution depots at Newport, Isle of Wight, and Portsmouth.

●**United States**—Plans to build a multi-million dollar melamine plant have been announced by Henry H. Reichhold, president of Reichhold Chemicals, Inc. Initial capacity of the plant, which is scheduled to go on stream early in 1961, will be 20,000,000lb. per year, but it will be designed for eventual expansion to 50,000,000lb. annually.

●**Malaya**—Malaya is to form an industrial finance development company to grant loans to industrialists. The company, which will have a capital of $M.15m., will be in operation from early next year. Principal shareholders will be the Government, leading banks and insurance companies.

●**United States** — Despite the country's increased facilities for reclaiming rubber and for the production of synthetic, the United States would still have to import large quantities of rubber for a long time to come. This was stated by the Assistant Secretary of Commerce for International Affairs, Mr H. J. Kearns, in an address prepared for delivery to the Chicago World Marketing Conference.

'Mean? What d'you mean I'm mean? Don't I get you hot water bottles cheap?'—449

Synthetic Rubbers in Cables—4

BUTYL RUBBER

By W. S. PENN, B.Sc.

BUTYL rubber has only been in use in the cable industry in the UK for about five years. It is still not used on a very large scale, but its use is steadily growing. However, the importance of butyl rubber in cables must not be judged by the quantity used. It has found application in a large number of specialized cables where no other materials have really been found satisfactory. Its use in such cases is expanding rapidly, but its use as a straight replacement for natural rubber as a general purpose material is very slow. This situation is unlikely to change in the near future and it is in this respect that the consumption of butyl rubber has not lived up to expectations.

Butyl rubber is important enough to deal with in some detail. There have been many difficulties in introducing the material into factories and it is well at this stage to know what they were and are. Such a consideration will help clear the way for future development.

Reasons for use

The most important reason for using butyl rubber in the cable industry is its heat resistance. Whereas natural rubber is considered to operate continually at 60°C., butyl rubber is suitable for 85°C. To the cable maker this means that cables can be operated at higher ambient temperatures, or that the conductor size can be reduced for a given current. For the purposes of this article, which way the heat resistance is utilized is of no importance.

The next important property of butyl rubber is its ozone resistance. This has made it particularly suitable for use as the insulation in high voltage cables. Voltages of 11kV are quite common, but higher ones have been used.

Coupled with heat and ozone resistance may be added moisture resistance. Butyl rubber compounds can be as good as PVC for moisture resistance. Sometimes butyl rubber insulation is used for its moisture resistance alone, but usually the property is utilized as a useful adjunct to its other characteristics.

The dielectric characteristics of butyl rubber are very good. Much higher values for insulation resistance than for rubber can be achieved with suitable compounds.

Previous articles in this series, which is to be continued, appeared in RJIP August 22 and 29 and September 5.

It is as well to remember that the flame and oil resistance of butyl rubber are no better than natural rubber. However, one peculiarity may be noted. Butyl rubber is quite resistant to ester based hydraulic fluids whereas PCP is not. Its chemical resistance in general is quite good.

Where used

It is difficult, in the case of butyl rubber, to give any large classes of usage, with one important exception. At quite an early stage in its history, it was adopted for shipwiring cables. It has frequently been used here in place of varnished cambric cables, mainly because of its far superior moisture resistance and therefore avoidance of complex cable terminations.

Another important usage is for certain railway cables. The heavy track-feeder types have already been mentioned (in the previous article in this series). Several other cables on trains, including high voltage types, are also using butyl on a reasonable scale.

An important usage for butyl is for cables for burial in the ground. The moisture resistance is important here. Large flexible high voltage cables are also using butyl, which is by far the best material for such a purpose. The use of smaller cables with butyl rubber insulation has also increased. They are being used in heated ceilings and walls and any spots in modern buildings where unusual heating methods require special cables.

PCP was described as essentially a sheathing material. Butyl rubber is essentially an insulating material. It is used for sheaths where exceptional heat resistance is required, but the robustness of such sheaths is only moderate.

Specifications

At the moment there is no British Standard for butyl rubber, although one will appear in due course. A standard frequently used is IPCEA Standard S-19-81 Appendix 0, or the same thing, ASTM D1352. The essential clauses, as far as this article is concerned are given in Table 1.

TABLE 1

Tensile strength, psi	600
Elongation, % minimum	300
Permanent set	½ in.
After ageing:	
(1) Air oven, 168 hours at 100°C.:	
Tensile strength, % original	60
Elongation, % original ..	60
(2) Air pressure, 20 hours at 127°C.:	
Tensile strength, % original	60
Elongation, % original ..	60

US Specification for Butyl Rubber

These requirements are quite modest and butyl compounds meet them without difficulty. The specification for butyl rubber approved by Lloyd's Register of Shipping includes some of the above clauses and the values in the British Specification will probably be similar. It should be noted that the specification is for insulation, there being no specification for sheathing grades.

Choice of polymer

The principal factor to be considered in the cable industry is unsaturation. The unsaturation and code names for the Enjay Company and Polymer Corporation grades of butyl are given in Table 2.

TABLE 2

Range of unsaturation, %	Enjay designation	Polymer designation
0.6–1.0	035	100
1.0–1.5	150	200
1.5–1.9	215	300
1.5–1.9 (non-staining)	218	301
1.9–2.3	325	400

Butyl Polymers

Theoretically the 0.6–1.0% unsaturation should be the best one for insulation particularly for high voltage purposes. Since such high voltage cables are not normally made by CV and the cure rate is relatively unimportant, it is perhaps as well to use this grade.

For CV a faster curing polymer is required and the 1.5–1.9% unsaturation type seems to be the most favoured. In fact this polymer can probably be quite satisfactorily used for all types of insulation. The accelerator system has nearly as much affect on most properties as

the polymer, at least in cable stocks. This aspect of butyl compounding should be kept in mind.

Basic Compounding

Some typical butyl cable compounds are given in Table 3.

Butyl cable compounds

It will be seen first of all that there are two fundamental accelerator systems. The best ozone resistance and water resistance is undoubtedly given by the red lead/dibenzo GMF type of cure.

TABLE 3

	Lapping and Longi. mix	CV mix	Black sheath mix	Black sheath mix
Butyl (035 or 100)	100.0	—	—	—
Butyl (218 or 301)	—	100.0	100.0	100.0
Stearic acid	2.0	2.0	2.0	2.0
Paraffin wax	10.0	10.0	8.0	8.0
Calcined clay	110.0	120.0	—	—
MPC black	—	—	50.0	50.0
MBT	3.0	2.0	2.5	3.0
TMT	—	2.0	3.0	—
Dibenzo GMF	1.5	—	—	1.5
Read lead	5.0	—	—	5.0
Sulphur	1.0	1.0	2.0	2.0
Zinc oxide..	5.0	8.0	5.0	5.0
Min. cure at 141°C.	40	30	35	40
Tensile strength, psi	950	1,020	1,450	1,400
Elongation, %	740	800	680	550
Tensile (after air oven ageing) ..	92%	85%	83%	90%
Elongation (after air oven ageing)	86%	83%	79%	85%

Butyl Cable Compounds

Unfortunately when one requires brightly coloured stocks, a more normal type of accelerator system must be used. It is difficult to be specific about such a system, and virtually any combination of MBT or MBTS, TMT and similar accelerators can be used. The quantity of each can also be varied within fairly wide limits without unduly affecting cure or scorch characteristics.

The use of calcined clay as a filler is quite standard. Unfortunately it results in a fairly high cost compound. Higher quantities of fillers can be used and still comply with the IPCEA specification. However this may introduce processing difficulties, discussed later.

In the black sheathing, MPC black has been given as an illustration. However HAF blacks may be used just as easily, but, as with PCP, perhaps blends are to be preferred.

Mixing Techniques

The mixing of butyl compounds is dominated by the need for 'heat treatment,' by the possibility of crumbing in the Banbury, and dispersion problems.

Whatever the type of polymer used it is highly desirable to heat treat with a chemical promoter such as p–dinitroso benzene. Before the start of the mixing operation, the Banbury must be brought to a temperature of approximately 350°F. with steam full on, which must be left on. A typical Banbury cycle is given in Table 4.

TABLE 4

Operation	Time (min.)
Add polymer	0
„ p-dinitroso benzene	1
„ half of filler and waxes ..	3
„ remainder of filler and waxes..	7
Sweep down	11
Discharge	13

Banbury cycle for Butyl Rubber Compounds

Slight variations on this cycle may be necessary, with the dibenzo-GMF type of cure since the red lead and sulphur may be added in the Banbury. Normally, the compound as mixed in the Banbury will be dumped on to a cool mill and the accelerator and sulphur added. Needless to say there should be no contamination at any stage with natural rubber on similar polymers.

If in the above mixing cycle, the mix can be discharged on to a really cool mill, the sulphur and accelerator may be added late in the Banbury cycle. If, however, dispersion troubles are being experienced it may be necessary to introduce additional mixing stages.

In the first place, it never does any harm to masterbatch troublesome ingredients, such as zinc oxide and accelerators. In any case, with the accelerators this aids more rapid dispersion on the mill, with consequent less 'heat history' to the compounds and therefore less danger of scorching. For dispersion troubles it does no harm to cool the compound off (as rapidly as possible) when it contains everything except sulphur. It should then be broken down again for the addition of sulphur, using as cold a mill as possible.

A difficulty with butyl processing, is that of 'crumbing' (powdering) in the Banbury. This usually occurs when attempts are being made to use higher quantities of fillers. Careful mixing is required to ensure success. Extra softeners can be useful and really full Banbury loads are desirable. The best method is to use a small quantity of 'seed' compound from a previous mixing.

Other processing characteristics

Once it has been mixed successfully, butyl rubber does not present any great problems in calendering or extruding. Calenders should be kept fairly cool. Any warming-up mills should also be kept cool and not too heavily loaded.

For 'longi' work the pressures on the rolls and their size may have to

Extruding a butyl sheath. Johnson and Phillips Ltd.

be varied to give satisfactory results. Rolls of tapes should not be kept too long or else it will be found impossible to separate them.

One of the biggest hazards of butyl processing, particularly with thick sections, is porosity and decentralization. As far as porosity is concerned careful mixing and treatment on the warming-up mills is the only satisfactory answer.

Butyl rubber is very soft in its uncured state and consequently the conductor tends to decentralize during cure. The use of sufficient curing tapes and not too much cable on a drum are possible remedies.

There is no great difficulty during CV or any other extrusion, provided plenty of cooling water is used. CV speeds are below those of rubber and there seems to be little likelihood of them ever being the same, without some fundamental change in the polymer.

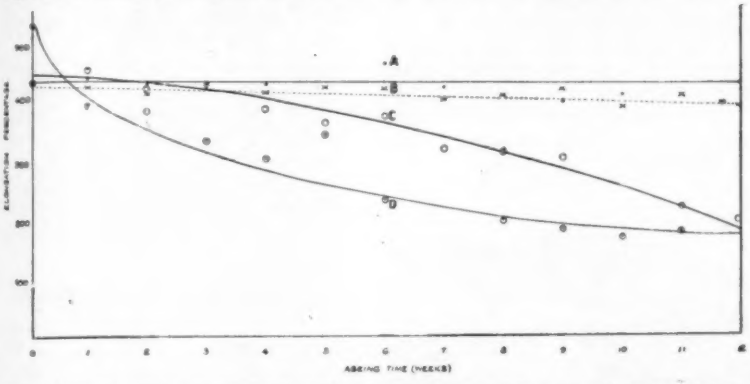


Fig. 1. Heat resistance of butyl rubber and natural rubber. A.—butyl at 82.2°C. B.—butyl at 100°C. C.—butyl at 120°C. D.—rubber at 82.2°C.

Heat resistance

There seems to be very little difference between most butyl compounds from the point of view of heat resistance, except between the two basic curing systems, the GMF/red lead types being the best. Some typical results are given in Fig. 1.

In Fig. 1, butyl rubber is compared with the natural product. Since the standard ageing temperature of cable stocks in the cable industry is 82.2°C., this is the lowest temperature at which the two stocks are compared. At this temperature the rubber deteriorates fairly rapidly, whereas the butyl is unaffected. As a result of this the continuous operating temperature is considered to be about 85°C.

The curve at 100°C. shows that butyl is not affected greatly at this temperature. At 120°C. however, deterioration is fairly rapid and 100°C. must be regarded as a top safe limit for long period operation.

Ozone resistance

A properly compounded butyl stock, and this means one with a GMF type of cure, has excellent ozone resistance. The conventional accelerator stocks are not as good but still give useful results. In the previous article in this series (Neoprene Sheathing Mixes) the ozone resistance of PCP was discussed. At an ozone concentration of 0.03% natural rubber disintegrated in eight minutes and PCP was satisfactory after 72 hours.

When the ozone concentration was increased to 0.18%, the PCP cracked after an additional 14 hours at this concentration. After an additional 60 hours at this concentration, the butyl compounds still had not cracked and the test was discontinued.

Moisture resistance

One of the important characteristics of butyl rubber is moisture resistance. However, this varies considerably according to the type of acceleration, not to mention the other compounding ingredients.

There are two methods of tests, one electrical, to measure increase in capacitance after immersion in water, and one gravimetric (see ASTM D470 and 1352). In the latter test the specimen is immersed in freshly boiled distilled water at 70°C. for 168 hours. The result is expressed in milligrams of water absorbed per square inch of surface. This must not exceed 15.0.

With GMF cured stocks there is no difficulty in meeting the specification. Values as low as 3.0 have been reported. With brightly coloured stocks, using TMT/MBT types of cures, values very near 15.0 or even over may be obtained. Much work is required on these coloured stocks.

Electrical properties

The electrical properties of butyl compounds are very good. The power factor and dielectric constant can be varied within reasonable limits by compounding, but values of 0.002 at 100 cps are possible for the power factor and of less than 2.5 for the dielectric constant. These low loss characteristics mean that butyl rubber is eminently suitable for high voltage cables.

The insulation resistance can also be very good. The resistivity is usually given as 1×10^{16} ohm. cm. but it can be higher. For GMF cured compounds this can mean very high megohms per thousand yards as insulation resistance.

General considerations

Although butyl rubber is a cheap polymer, its compounds are normally more expensive than natural rubber. This is because of the expensive curing systems and the types and quantities of fillers used. Before butyl can become the general purpose polymer for cables the cost must be brought down by some major compounding changes.

Another difficulty with butyl rubber is various aspects of processing. Claims for high CV speeds have been made, but do not seem to have been substantiated. These speeds must be increased. Again the problem of the softness of uncured butyl stocks is still very prominent. Possibly a saturated high styrene-isobutylene copolymer would help here.

Finally its physical characteristics leave much to be desired. Tensiles of about 1000 psi can be obtained for coloured stocks and 1500 for black stocks. However, robustness is not always measured by tensile strength and the 'soft' feel of butyl rubber must be eliminated.

The problems presented above are formidable. Not until they have been solved by the consumers and producers working closely together, will the use of butyl rubber expand at the expected rate.

The Plastics Group of the Metal Box Co. Ltd., 37 Baker Street, London, W.1, announces the availability of 'Densothene'—a grade of high density polythene. Of major interest at present to food packers, 'Densothene' makes available one more aid to easing the task of the housewife; with it, prepared foods can be cooked by boiling in the bag.

Goodyear Terra-Tyre

FIRST DEMONSTRATION IN BRITAIN

A BARREL - SHAPED, low-pressure tyre capable of traversing terrain hitherto uncrossed by vehicles was recently demonstrated in this country for the first time at Romney Marsh, Kent. It is the Terra-Tyre, developed by the Goodyear Tyre and Rubber Company. The tyres enabled a modified Bedford 4 x 4 truck and Dyson four-wheeled trailer, and a converted Land Rover, to negotiate the soft, muddy and often bottomless Kentish marshland conditions with ease. They are of tubeless construction, axle driven and are clamped on to specially designed wheels.

The modified Bedford truck—fitted with 46 x 18 x 20 Terra-Tyres on the front and 46 x 24 x 20 on the rear—hauled the four-wheeled trailer (on 46 x 24 x 20 Terra-Tyres) through the soft marshland while carrying a 10,000lb. load of 30ft. steel tubes. An unladen conventional tyred 6 x 6 truck trying to negotiate the same terrain immediately became bogged down. During the demonstrations tyre pressures were varied from 15 psi down to 8 psi according to the conditions.

AUSTRALIAN SYNTHETIC RUBBER

Synthetic rubber will be produced in Australia in 1961 by affiliates of Standard-Vacuum Oil Company and Goodyear Tire and Rubber Company, the Standard-Vacuum Oil Company announced on July 17.

Goodyear Tyre and Rubber Co. (Australia) Ltd. has acquired a substantial interest in Australian Synthetic Rubber Co. Ltd., which was formed recently by Stanvac's affiliate, Vacuum Oil Company Proprietary Ltd. An $11m. plant will be constructed near Melbourne.

Engineering is under way for the rubber plant, for a polythene plant to be built and owned by Union Carbide Australia Ltd., and for a styrene plant to be owned and operated by a company jointly owned by CSR Chemicals Ltd. and Dow International. The four plants are expected to be in full operation by mid-1961.

Monsanto Appointment

Mr D. C. M. Salt, director of sales, has been appointed alternate to Mr J. W. Urban on the board of Monsanto Chemicals Ltd. Mr Salt, who joined Monsanto in 1935, has a wide experience and knowledge of the company's selling operations. He was appointed general manager of sales in 1956 and, prior to his recent appointment, was general manager of chemicals division.

POA Minibition

A number of companies in the rubber and plastics industry are participating in the 1959 'Minibition' to be held by the Purchasing Officers Association, September 24—26 at Folkestone. Precision Rubbers Ltd. are showing mouldings and extrusions; John Summers and Sons Ltd. will have 'Stelvetite' on display; the Nobel Division of I.C.I. and Midland Siliconcs are both demonstrating the application of silicones to industry, while Melamine laminates and tableware are to be exhibited on the stand of British Oxygen Chemicals Ltd. There are more than 100 exhibitors.

Russian Synthetic Rubber

Overall Soviet synthetic rubber producing facilities will be more than trebled between now and the end of the seven-year plan in 1965, according to *Tass*, the Soviet news agency.

Mr F. G. Bell and Mr W. E. Kearnes have been co-opted on to the Board of Crystalate (Holdings).

US Stockpile Rubber

SPRING RELEASE OF 40,000 TONS

CONGRESSIONAL officials on September 2 reported that there was no disposition to rush an agreement on the Independent Services Appropriation Bill. They would not predict when the Senate would act on the measure.

On August 31 both the Senate and the House passed legislation allowing the Independent Agencies of the Government to operate, as they did in July and August, on temporary funds up to the end of September.

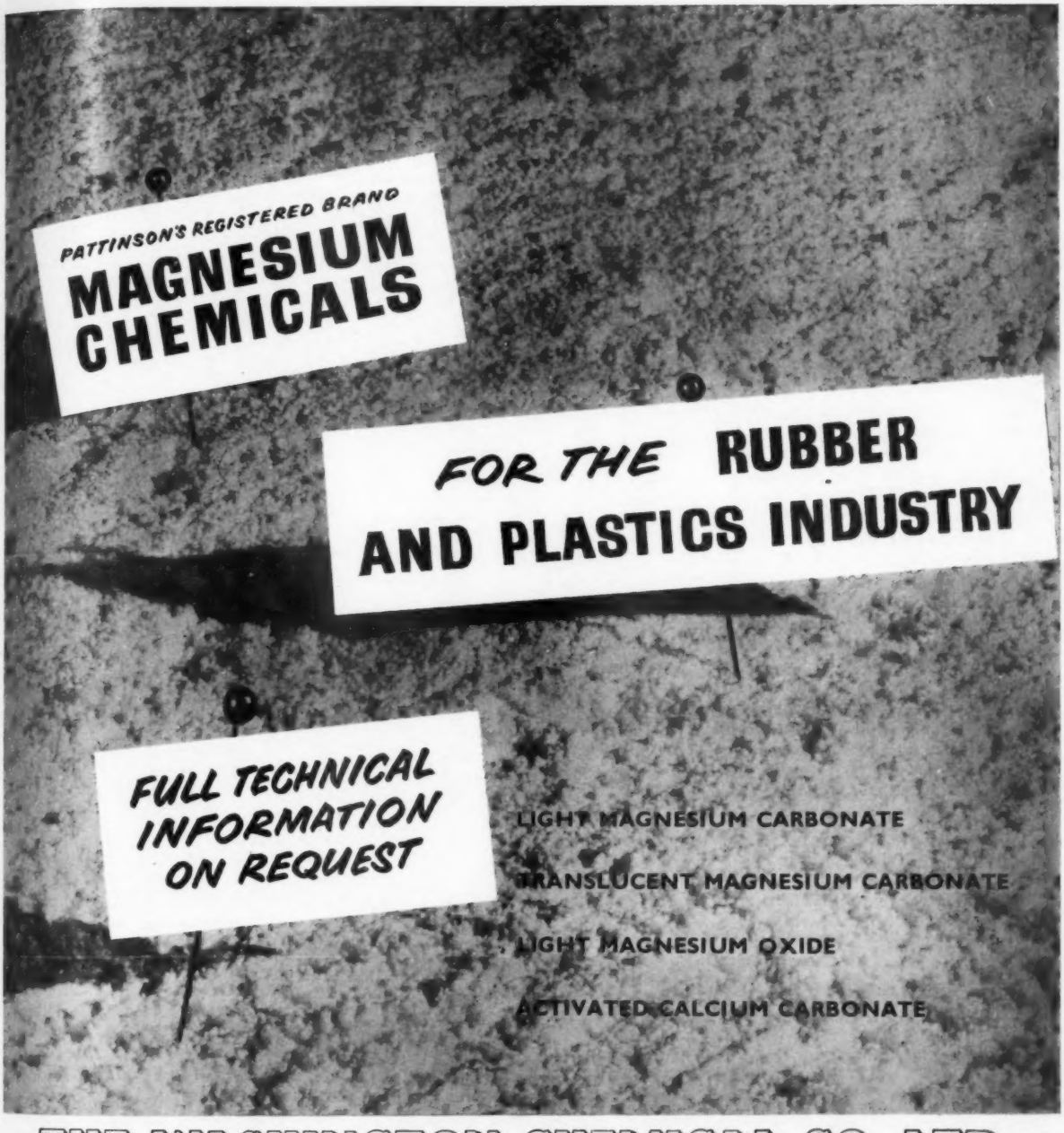
The Bill contains an appropriation of $50m. to allow the Office of Civil and Defence Mobilization to make a very limited rotation in the 1960 fiscal year of stocks of natural rubber, oils and fibres held in the national stockpile of strategic materials. OCDM officials have said that the small appropriation would force the sale sometime next spring of about 40,000 tons of rubber now in stockpile.

A statement on consultations between Malaya and the United States has been issued by the Malayan Government.

'The United States Congress has been considering the question of financing the rotation of perishable materials in the stockpile since May this year and it has been known since early in 1958 that some perishable materials, including rubber, were excess to the US strategic requirements.

'Though the US Congress has not yet made any decision, it seems most probable from reports of its proceedings that it will decide on some measure for the disposal of rubber.'

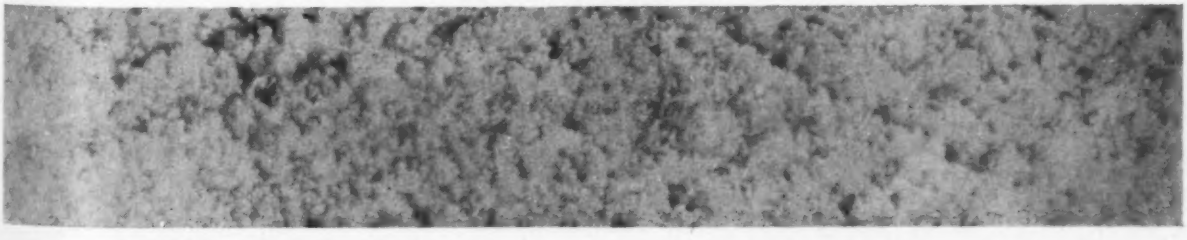
The statement went on: 'It is obvious that this decision might have an adverse effect upon the economy of producing countries unless sales of rubber from the stockpile are so regulated as to avoid disruption of the market.'



THE WASHINGTON CHEMICAL CO. LTD.

WASHINGTON, CO. DURHAM, ENGLAND Telephone: Washington 3333

A member of the TURNER & NEWALL ORGANISATION



LONDON OFFICE: Empire House, St. Martin's le Grand, London, E.C.1. Telephone: MONarch 6898.
MANCHESTER OFFICE: 220/222 Corn Exchange Buildings, Cathedral Street, Manchester, 4. Telephone: BLAckfriars 4401
Agents throughout the world

The Analysis of Plastics

3—CHARACTERIZATION OF FLEXIBLE MATERIALS

MR A. G. WILLIAMSON, analyst of the Research Association of British Rubber Manufacturers, recently gave the third lecture in the evening series on 'Analysis of Plastics' at the National College of Rubber Technology. The flexible materials to be considered by the lecturer included the fluorinated rubbers and plastics, polythene, flexible compounds of polyvinyl chloride, and natural and synthetic rubbers.

The analysis of an unknown finished product, and particularly its polymeric constituents, said Mr Williamson, was the main problem he would consider. This was complicated by the frequent presence of many ingredients other than polymer, and by the increasing range of available polymers. Besides copolymers and terpolymers, graft polymers were occasionally met, and there was a risk of missing a minor quantity of a second polymer such as factice.

The three groups of components of an unknown material were the polymer or polymers, the non-polymeric organic materials such as plasticizers, and the inorganic and organic fillers and other ingredients. The first step was to remove plasticizers by extraction, *e.g.* by acetone overnight, if possible in a Soxhlet apparatus, from the sample sheeted very thinly. Polymeric plasticizers required methanol extraction.

Polymer Identification

For the identification of polymer in the extracted and dried sample, the best single technique was infra-red spectroscopy, described by Mr Branch in the previous lecture. However, ordinary chemical methods were usually needed also, and when only one polymer was present, a fairly standard systematic scheme was usually satisfactory. In this the first chemical test was burning, and it was important to remember that if the polymer was immediately self-extinguishing on removal from the flame, the smoke should not be smelt because possible fluorine compounds were highly toxic. A Beilstein copper wire test for halogen other than fluorine was also useful at this stage.

The next chemical test was sodium fusion, according to which polymers with various combinations of nitrogen, halogens and sulphur were classified into seven groups. The lecturer discussed details of the more specific tests to be carried out on each of these groups, after handing out copies of an outline scheme based on that of the Services Rubber Investigations (U9A) as modified by the National College of Rubber Technology. For polymers containing vinyl pyridine a useful test had been developed by Mr D. A. Smith, which involved the use of Mayer's Reagent. The differential swelling test of U9A was now less useful than originally, because the inclusion of some newer polymers on the graph, in positions shown by the lecturer, caused some overcrowding.

When more than one polymer was present, or in the rarer occurrences of graft polymers, the problem was more difficult. An attempt should be made to separate the polymers, assisted by published information on the polymers likely to be used in the application concerned. Selective extraction could be used to remove a thermoplastic polymer from a cross-linked network of another polymer, and sometimes one polymer could be degraded, *e.g.* by ozonolysis, leaving the other intact. Frequently separation was impossible and then one might have to rely on specific tests for the individual polymers.

Infra-Red Spectroscopy

Although infra-red spectroscopy was useful, there were frequently difficulties in sample preparation. The usual method was solution, filtration or centrifuging, and film casting. However, with a number of polymers a solution could not be obtained even when the polymer identity was already known. The separation of carbon black, which was a strong infra-red absorber, had to be thorough and was often troublesome. These difficulties were avoided by pyrolysis of the extracted material, followed by infra-red examination of the distillate. The distillate was a derivative of the polymer with a spectrum which, though different from that of the polymer, was remarkably reproducible from sample to sample. The method was simple and the polymer might be identified within half an hour after extraction. A library of reference spectra had to be assembled from trials and published spectra. Fortunately the spectra from cured polymers differed little from those of the raw polymers, and the spectra of the distillates of mixed polymers were additive, like those of the original polymers. The lecturer showed spectra illustrating uses of the method.

After mentioning the value of gas chromatography, to be discussed by Dr Haslam in a subsequent lecture, Mr Williamson described methods of examination of proofings and thin flexible films, according to a scheme of which copies were handed out.

The lecturer then discussed quantitative methods of determination of polymers and elements. For hydrocarbon polymers a recent development, now in draft BS form, was the pyrolysis method for total rubber hydrocarbon. For natural rubber hydrocarbon the chromic acid oxidation method was well known. Estimation of chlorine-containing polymers relied on chlorine estimation, with knowledge of the chlorine content of the raw polymer. This was straightforward with neoprenes, but with PVC an accurate check for polyvinylidene chloride and polyvinyl acetate was necessary. For chlorine the Carius method was accurate but lengthy, and with the Parr bomb the lecturer recommended the method of Haslam and Soffett. Other constituents for which methods were discussed in detail by the lecturer included fluorine, acrylonitrile polymers, silicones, polyisobutene, SBR and unsaturation.

Frequently the quantity of polymer had to be obtained by difference, and then it was necessary to analyse quantitatively the other ingredients. The lecturer discussed the methods available for extractables, inorganic fillers, carbon black and other organic fillers.

Finally Mr Williamson said that the most useful aid to the analysis was a knowledge of the use of the material, which often considerably narrowed the possibilities. In difficult cases it was well worth reading the literature to find the types of composition in use for the particular application.

Discussion

The lecture was followed by a discussion in which the lecturer agreed that specific gravity was a useful check on a total analysis, and suggested that a calcium determination as a check on loss of carbon dioxide from whiting could often be avoided by knowing the probable whiting content and totalling to 100%. Different acrylate polymers were hard to distinguish, especially ethyl and butyl, but the IR spectra were often helpful. Polyvinyl ethers did not fit into the analysis scheme given, but they were seldom met.

For delayed action accelerators—

Monsanto

See Monsanto first!

Monsanto has the chemicals you need . . .

SANTOCURE · SANTOCURE NS · SANTOCURE MOR

In addition to the above products Monsanto's range of accelerators includes:

Aldehyde amines, thiazoles, guanidines, thiurams and dithiocarbamates.

Monsanto works constantly to develop new, better chemicals for rubber—as well as to improve those you already use.

Santocure is a Registered Trade Mark

Monsanto chemicals help industry – to bring a better future closer

Monsanto

Regd.

MONSANTO CHEMICALS LIMITED

579 Monsanto House, Victoria Street, London, S.W.1, and at

In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto Canada Ltd., Montreal. Monsanto Chemicals (Australia) Ltd., Melbourne. Monsanto Chemicals of India Private Ltd., Bombay. Representatives in the world's principal cities.

Rubber and Plastics News

CONTINENTAL AND FOREIGN DEVELOPMENTS

DISPERSED sulphur and vulcanizing agents for rubber compounds have been produced in France. The composition is 75% triturated sulphur capable of passing 200 mesh, it is estimated; and 25% plastifier rich in aromatics. Use of this product is said to have the following advantages: markedly improved mechanical properties, in both the butadiene-nitrile-acrylic mixtures and the mixtures of natural rubber of the GR-S type; increases of mechanical resistance after ageing, greater in proportion as less sulphur is used; reduction in vulcanization time, even with smaller amounts of sulphur; perceptible reduction in mixing time, and therefore lower mixture temperatures, and in the danger of prefixation of mixtures, calcining, etc.

Zinc Stearate Dispersion

Another French firm has put on the market a zinc stearate dispersion which has many advantages, it is claimed. Among these are suppression of zinc stearate dusts, always extremely important; and the deposition of an extremely thin film of zinc stearate on raw mixtures; in this way excessive thicknesses of zinc stearate, always extremely harmful, are prevented. Previously, the stearate was used in the form of a powder. The concentration of this dispersion is from 45%, which is exceptionally high for a pigment highly water-repellent. The stearate can also be used as a parting compound.

Polystyrenes

A new range of polystyrenes is another product of French ingenuity. There are two categories: (a) Lorkalene 8, a polystyrene current quality, has a high temperature of flexion under load, tensile strength and bend strength. Moreover, it has excellent heat resistance. Thanks to its rapid hardening property, it enables very short moulding cycles to be obtained in many instances. (b) Lorkalene 80, a polystyrene of 'shock' quality, which has excellent behaviour under conditions of heat, as well as good mechanical properties.

Vulcanized Stickiness

The mechanism of the development of stickiness in vulcanized rubber has been further studied in France. It is suggested that the original structure of a vulcanizate network is, according to the vulcanization, the effective factor in initiating the development of stickiness. Ageing conditions and the eventual presence of pro-oxidant substances stimulate the action of oxygen and in consequence make it more harmful. The sharp increase in swelling and fall in elastic modulus when stickiness appears reveals a marked loss of tension in the network. This collapse is attributable to scission occurring on the double bonds along the chains, and also in intermolecular linkages, whose chemical strength is variable. It follows that the development of stickiness can be achieved by a preservative formulation including (a) a combination capable of preventing the absorption of oxygen, and (b) a deactivator to substitute intermolecular linkages by cross-links (with probably a high break energy).

French Measuring Apparatus

A process and apparatus of French origin are designed to measure the elongation, breaking strain and elastic modulus of elastic threads. It consists in fixing and rolling the extremities of an elastic thread on a rotating axis, thus forming several spirals of thread on this axis. The retention of the median part of the thread is ensured by passage over one or several rollers providing no perceptible friction. The properties measured are elongation, breaking resistance and elastic modulus.

Friction Wheels

Friction wheels have been invented in Germany which comprise an elastic casing maintained by frictional adhesion on the inclined support bearings. At the base of this casing groups of threads are let in which are placed at a certain distance apart from each other in the transverse direction.

French Brake

Another French invention is a brake having an elastic membrane, which enables one to stop the relative movement between two organs situated opposite one another. It comprises a body in which is arranged a source of compressed fluid, a seating, means for putting the seating and the source, into communication, and a deformable membrane on which the brake shoe is fixed.

Shoe Soles

From Germany comes a wearing sole for shoes. This comprises an arrangement capable of ensuring a firm bond between the wearing sole and the first sole, of ski-ing shoes, in particular. The wearing sole forms a protective rubber edge in the form of a U, which surrounds the edge of the first sole, to which it is firmly fixed by an adhesive or by nails.

Belt Protection

The French are developing a method of perfecting flexible belts by means of a protective covering. From place to place on the cords or cables constituting the resistant covering, solid metallic salients are fixed. These have a volume and a surface condition such that they ensure the best possible anchorage of the cords in the flexible material of the belt.

Anti-skid Device

Italy has developed an anti-skid device consisting of a series of active elements designed to be transversally applied to the rolling surface or tread of a tyre and bound by their ends to annular elements of lateral type, one of which is in metallic profile. These form supports and are placed on the two sides of the tyre.

Pre-coated Sand

Another Chinese development is the cold process for the preparation of pre-coated sand. This process consists of forming a thin resin film around the surfaces of moulding sand for foundry use. The advantages of this process are said to be the reduction in the amount of resin to resin-sand mixture, the elimination of the segregation of resin from sand and the making easier of the blowing process of producing shell moulds and cores. Pre-coated sand with furfural as the solvent is recommended, but so far the development is in the research stage only.

Chinese Turbine

The Chinese are necessarily having to carry out their vast plans of industrialization by means of appliances

How to finish in the money

One way to assure your product of a profitable finish is to start with a size based on CHEMIGUM LATEX.

CHEMIGUM LATEX is a colloidal dispersion of a butadiene-acrylonitrile copolymer having excellent acid-salt tolerance and mechanical stability. It is easily compounded and readily applied at room temperature on conventional slashing or padding equipment.

The end result of using CHEMIGUM LATEX is a permanent finish which exhibits unusual abrasion- and crock-resistance, a pleasant hand, dimensional stability and colour fastness. Such a finish also compensates for the adverse effects of other treatments.

Details on how CHEMIGUM LATEX can give you money-making finishes or improve warp-sizes, backings, binders, inks or adhesives are yours for the asking. Just contact your nearest Goodyear Chemical Distributor.

CHEMICAL
GOODYEAR
DIVISION

Distributed in the United Kingdom by:
HUBRON SALES LTD., FAILSWORTH, MANCHESTER
TEL: FAILSWORTH 2691
Other Distributors in all Western European Countries

Goodyear International Corporation, Chemical Division, Akron 16, Ohio, U.S.A. The Goodyear Tyre & Rubber Company (Great Britain) Ltd., 17 Stratton Street, London W1, England

Chemigum, Plioflex, Pliolite, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio, U.S.A.

CHEMIGUM • PLIOFLEX • PLIOLITE • PLIOVIC • WING-CHEMICALS
High Polymer Resins, Rubbers, Latices and Related Chemicals for the Process Industries

that would, in the West, be regarded as primitive. Thus, they are using a wooden propeller water turbine in their rural power stations. The redesigning of this type of turbine has become necessary, and one of the improvements being advocated at the present time is the substitution of the ball roller thrust bearing by a rubber-made thrust bearing which is installed under the bladed wheel, with water used as a lubricant. Such a device is said to have been working satisfactorily for a whole year since its installation.

Italian Developments

Two new synthetic materials are being prepared in Italy. For the tyre industry, but not, perhaps, available for from two to five years, is a propylene-ethylene co-polymer, which is claimed to be less expensive and far longer-lasting than the co-polymers now used for tyre casings. For the textile industry in a shorter period will be produced fibres made of polypropylene. Sample robes and blankets made from this second material have already been exhibited. The material feels like wool and is said to be light, strong, wrinkle-resistant and quick-drying. It is said also that it will cost less than nylon once it is in full-scale production.

Vulcanizing Shoes

A machine for moulding and vulcanizing shoes comes from France, and consists in the combination of several fixed moulding and vulcanization elements and identical mobile elements. It comprises also a thermal insulation so as to reduce the heating time and prevent the undesirable overheating of some parts of the machine.

Russian Research

The science of polymers is making considerable strides in the USSR. In the rubber industry, the most interesting sectors are those dealing with the polymerization of vinylic compounds, catalyzers with a base of boron, and the polymerization and copolymerization of isoprene in emulsion with vinylic monomers. The products of the reaction of trifluoride of boron and of tributyl of boron are excellent catalyzers for the polymerization of ethylene and propylene under conditions identical to those of the reactions of Ziegler and Natta. It has been found that the copolymers of styrene and the polymers of vinylchloride type have higher softening points than those of pure polymers of the components. Work has been done on the synthesis of monomers containing boron, fluorine, phosphorus, silicon, aluminium, and titanium, which can be transformed into rubbers and plastics resistant to heat and with a high softening point. A polymer of isoprene which seems to be a block copolymer possesses a high tensile strength for a maximum elongation.

Degradation of SR Latex

Germany has been carrying out research into the oxidizing degradation of synthetic rubber latex. The subject of these researches was to facilitate the plastification of the material by the degradation of synthetic rubbers. It has been observed that Buna S3 can under certain conditions be degraded in the latex state. The influence of the catalyzers: phenol alkyls and metallaic naphthenates, has been studied. The new process is, however, not recommended for industrial use. In applying the process to natural rubber, it has been found that with the catalyzers enumerated above, as well as with secondary amines, thermoxidizing degradation takes place more rapidly in natural latex than in synthetic latex.

Polyacrylamide

Polyacrylamide is a non-ionic polymer, soluble in water, neutral, and is obtained by the vinylic polymerization of acrylamide. This material, the French suggest, has certain fundamental properties which render it markedly superior to other polymers. Derivatives have been obtained of an ionic type by sulphomethylation, and cationic derivatives by reaction of the Hofmann degradation and by aminoethylation.

Catalytic Dehydrogenation

New details are forthcoming regarding the catalytic dehydrogenation of the mixture n-butane n-butylene starting from 1.3 butadiene and the stages of extraction of ammonium acetate and copper to obtain pure butadiene. The dehydrogenation, the concentration of butadiene and polymerization are automatically controlled. The recuperation of the monomer and the ulterior treatment of the latex are given. The source of these details is German.

Polymer Viscosity

The viscosity of cast high polymers is being determined in France by means of ultrasonic equipment. The apparatus used is of the high viscosity type. It comprises a sonde consisting of a bar of magneto - strictive steel separated into two parts by a diaphragm. Half is in the interior of the body of the sonde in a bobbin insulated by a ceramic material. The other half is designed to be immersed in the fluid whose viscosity is to be measured. The sonde is linked by a coaxial cable to the casing of the electronic apparatus. The results obtained on various products are obtained on various products are fyingly precise manner. The apparatus can give certain service in the study of cast high polymers when it is desired to establish comparisons between the different varieties of the same product or when the evolution of a phenomenon is to be followed, such as polycondensation, polymerization and gelification.

Chlorotrifluorethylene

The influence of the solvent on the speed of polymerization of chlorotrifluorethylene has been studied in Czecho-Slovakia. Typical solvents include benzene in several concentrations. The chlorotrifluorethylene was primed with a benzoyle peroxide. No simple relation was found to exist between the concentration and the speed of polymerization. The solvents do not behave in the same way as diluents.

PVC Reticulation

The reticulation of polyvinyl chloride as a result of ionizing radiations has been studied in Czecho-Slovakia. When the polyvinyl is in powder form, reticulation is weak even for a radiation dose of 150 Mr. It has been found, however, that irradiation of PVC in the gel state in certain solvents produces complete reticulation for radiation doses of the order of 50 Mr.

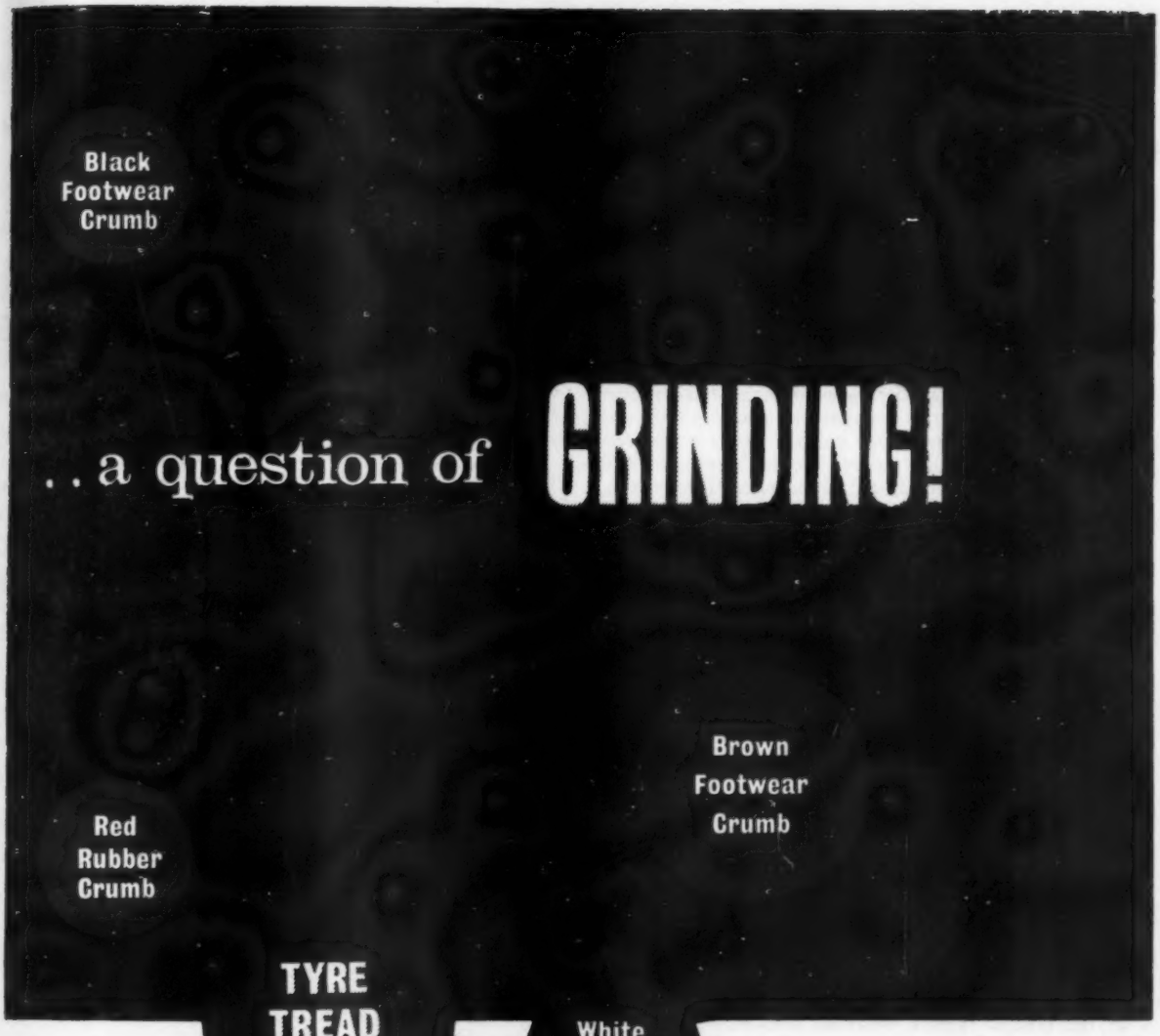
FBRAM Golf Competition

The annual golf competition organized by the Federation of British Rubber and Allied Manufacturers is being held at the Wentworth Club on October 14. It will be followed by an informal subscription dinner to be held at the Club after the day's play.

Mr H. G. W. Chichester - Miles, President of the Federation, will present the prizes in the bar at approximately 6 p.m.

The Director of the Federation hopes that this year he will have succeeded in choosing a calm and sunny day, and that as many players as possible will attend, both from the ordinary and from the associate membership. Non-playing members will be welcome to watch the play and to join the players at the informal dinner in the evening.

Those who have not yet received entry forms for the competition should apply at once to the office of FBRAM, 43 Bedford Square, London, W.C.1.



STANDARD MESH SIZES:
18's 20's 24's 30's

. . . and the B.R.R. group have the answers. For over 80 years we have been solving problems of grinding for many well-known manufacturers whose products are household words. A wealth of knowledge and experience is therefore available to you. New laboratories with the very latest equipment back our technical service which is at your disposal.

All enquiries welcomed by :

ASSOCIATED COMPANIES
*
JOSEPH ANDERSON & SONS LTD.
*
IRKDALE INDUSTRIES LTD.

BRR

BRITISH RECOVERED RUBBER AND CHEMICAL COMPANY LIMITED
ASHTON NEW ROAD · CLAYTON · MANCHESTER

Telephone : EASt 1406-7-8 *Telegrams: 'Reclaimed' Manchester*

VIEWS and REVIEWS

'Selling' the Polymer

THE 54-page brochure relating to general information concerning the National College of Rubber Technology and, in particular, to the Dates of Terms and Courses for the period (roughly) end-September 1959 to end-September 1960, has appeared in an elegant green-and-gold jacket (not to mention the (mainly) red, white, and gold quarterings of the shield). It is a document which grows in stature yearly, but the emphasis for the current period is that shown as the main Title—or is it 'Description'?—on the said jacket, which is 'Polymer Technology.'

If I lay some emphasis on designation it is partly because (a) it has been suggested, almost from the very start, that the College should be known as the college of 'high polymers,' or something of the kind, and that (b) the 'high' has been dropped, and that (c) there are 'Polymers' which require (as regards nomenclature) a good deal of liberal imagination to bring them into either the elastomeric or the 'plastics' fold. Having developed this great thought, I find that it is expressed much more accurately, and, in detail, on page 46 of the NCRT prospectus, where we find a suggestive section on '*Polymer Science.*' Thus, there is a sub-section headed: '*Polymers Occur Widely in Nature,*' from which one might almost infer that Nature Abhors a Monomer. However that may be, and I half expect that someone will throw air and water at me, I do not apologise for quoting the following:

'Many naturally occurring materials are polymers. In the inorganic mineral world, rocks, clays and sands are all polymers based on units containing silicon and oxygen. In the organic world, the basic structural materials of living organisms are polymers: cellulose in plants, and proteins in animals. The products of metabolism of plants and animals may also be polymeric. One important example is natural rubber, a long chain of isoprene units . . . which occurs in certain trees as a latex, which, in turn, is a suspension of polymer particles in an aqueous medium.'

Then follows a useful section on synthetic polymers, and still further (on page 46) a sub-section headed 'Polymers Can Assume Three Different Physical Forms.' In explanation:

'. . . some polymers can be extended to many times their initial length, yet on releasing return to their original dimensions: these are called rubbers. Others, the plastics, cannot be reversibly deformed, and are often hard and glossy. Still others are characterized by a strong tendency to form fibres which are strong along their length but may be quite weak laterally. Such polymers can be readily spun or woven or knitted into fabrics.'

The story opened on the lines indicated above, is then developed into a brief essay on the science and technology of Rubbers, Plastics, and Fibres, attractively told and illustrated.

Polymers in Lectures

To contemplate another facet of the 'Polymer' idea, as developed at the National College, I hark back to the particulars (*pp. 30 et seq.*) in the section describing 'Associateship Lectures.' Here we find headings such as 'Polymerization'; 'Structure and Arrangement of Polymers'; 'Properties of Polymers'; 'High Polymer Physics'; 'Physics as Applied to Polymer Problems'; 'Raw Polymers,' with details and illustrations likely to interest still further the budding polymer student.

The Moral

If one attempts to correlate the matters underlying the above references and abstracts with the title of the NCRT brochure for 1959/60, namely 'Polymer Technology,' it is a fair inference, as it appears to me, that consciously, or sub-consciously, one of the objects of the prospectus of which the jacket sub-title is 'Scientific Courses in Rubbers and Plastics for Men and Women,' is to develop the 'Polymer' idea (or ideal?), an idea or theory round which the greater part of the modern science of the elastomers and plastics, and perhaps (as the future may plainly see) much of the practical technology of these two branches of a far-flung growth, has been constructed.

In the NCRT 1959/60 'Polymer Technology' brochure/prospectus one may, I think, hold or infer that the outstanding importance of 'The Polymer' has been duly recognized and successfully developed.

General Information

Having, so far, hitched my ideas on to the polymer star, it must be pointed out that our brochure contains much other information of interest and importance. First, we have a note on the origin of NCRT, and an introductory statement as to its building and technical facilities, followed by particulars re dates of courses and holidays (for 1959/60). We then come to the impressive, and one might almost say, formidable, list of 30 members of the Board of Governors, starting with the Chairman, H. Rogers, F.I.R.I., nominated by the Minister of Education. Then we come to particulars of staff, of the NC Diplomas, of the various Courses, of Fees, of a number of valuable Scholarships, of Research Fellowships, and of Prizes. Finally we have a detailed (illustrated) section on Lectures, Equipment, and others on 'Facts about Rubber and Plastics,' and 'Polymer Science.' 'Opportunities in the Rubber and Plastics Industries.'

Skim as Fertilizer

The *Planters' Bulletin* for July 1959 contains an interesting note on 'Disposal of Skim Serum' as a fertilizer. Skim serum described as 'An unwanted by-product of latex concentrate production, is normally disposed of in the nearest stream.' This procedure not only tends to aggravate stream pollution, but also represents, according to the view of the *Bulletin*, a direct loss to the land of valuable plant nutrients.

It appears that a method of using the serum as a fertilizer is already being practiced on a few estates. The method of application to the soil is described in the note,

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

but a few particulars re composition, cost and value, etc., based on the *Bulletin's* remarks should be of interest.

a. Undiluted skim serum from the coagulating tank varies a little in composition, but usually contains about 4% total solids, which include some 0.26% of (ammonical) nitrogen in the form of ammonium sulphate, 0.09% of (protein) nitrogen, and about 0.2% of potassium. This composition makes skim serum 'a useful, if somewhat unbalanced fertilizer which can be used as a source of both nitrogen and potassium for rubber trees.'

b. It is possible to dispose of a factory's entire output of skim serum over a comparatively small estate area (7% or less), and to eliminate over that area the need for separate applications of ammonium sulphate and potassium chloride.

c. It is held as regards remanent H_2SO_4 in the serum, that this is not sufficiently concentrated 'to have a marked effect on soil acidity, but spraying onto the bark of trees is to be avoided.'

Cost

In a general way applications of skim serum at the rate of 6-7 gallons per tree three times a year is advised, supplemented by the addition of rock phosphate at the rate of 1¼lb. per tree every two years (for mature rubber, but less for young trees).

Experience so far available indicates that the cost of applying 450-650 gallons to the acre is around 4 to $5 (Malayan). In 450 gallons of serum, the value of the ammon. sulphate alone is a little over $6, 'so that applying the serum in this way appears to be cheaper than buying ammonium sulphate for fertilizer.'

Some further details will be found in the article quoted, but it may be added that those contemplating the use of skim serum as a fertilizer are advised to send samples of their skim serum to the RRIM for analysis, so that specific advice regarding the rate of application may be given.

New Fluorocarbon Resin

The leading feature in the June/July issue of our sprightly contemporary the *Du Pont Magazine* relates to a 'Partner' for a '"Tough Guy" Plastic' (*i.e.* '"Teflon" TFE,' that is tetrafluoroethylene), the new material being 'Teflon' *FEP* fluorocarbon resin, the FEP standing for 'florinated ethylene propylene.' A short description of the new material as 'a true thermoplastic that can be melted, moulded and extruded,' is given, and it is added that Du Pont is to begin quantity production late in the present year.

With regard to the melt-flow properties it can be moulded and extruded like nylon, polythene and other resins familiar to the industry. 'In appearance the product resembles high-density polythene,' the transparency is excellent in thin sections, and in greater thicknesses is a translucent white.

Commercial Items

Du Pont is to market FEP as a granular powder—at an initial price of about $12 (*i.e.* about £4 4s.) per lb., and also as a film and thin-walled tubing.

Applications

Differentiation in applications between FEP and TFE are not (yet) clear cut, but while TFE 'can be exposed continuously at 500°F. . . . FEP is limited to about 400°F. . . .' but the 'prediction is that there will always be jobs one or other can do better, but that a middle ground will develop in which either material can be used.' Amongst the qualities the two types share, both are excellent electrical insulators, and what is important in high frequency application, they retain their insulating ability over a wide range of temperatures and frequencies. Other properties are that both have no known solvents, and are unaffected by most chemicals. Moreover, 'practically nothing sticks to them'; *e.g.* a film of either placed under the ice-cubes tray in a frig. will prevent the tray from sticking.

However, a direct question to Bob Stiehler (Polychem. product technologist) as to where FEP would be used to begin with, elicited the reply that 'Three-quarters of the market is expected to be in wire and wire products. . . . The remainder will go into injection moulded parts, tubing, hose and a variety of other end uses.'

A reply to the question: 'What does FEP offer the wire user that he doesn't have?' was:

'A wire and cable coating resin that is easily pigmented, and that gives a high quality, chemical-resistant jacket in long, continuous lengths, free of flaws and capable of continuous service at 400°F. . . . FEP also shows no evidence of turning brittle after prolonged heat ageing. These qualities add up to outstanding reliability.' Other qualities of FEP will be found on reference to the original. Some of the applications—and apparent* differentiations from TFE are to be seen in illustrations. Thus: *a.* 'Three-wire twisted cable has a primary insulation and jacket of FEP. It's economical to make because FEP is easily extruded.' *b.* 'Coaxial cable has primary insulation of TFE resin, a jacket of FEP over braid to ward off chemicals and moisture,' and *c.* 'Encapsulated moulding of electronic parts is possible with FEP, extending benefits of "Teflon" to areas once excluded.'

PHILIP SCHIDROWITZ

*So far as the reviewer can judge, where there is differentiation, it is, generally of degree rather than of kind, but that in general, there may be some differentiation as regards comparative processability. If this view is not, broadly, accurate, I trust that I may be corrected.

Plastics Institute Examinations

Candidates who have completed the educational requirements for the associateship, graduateship and for the diploma are as follows: Associateship: D. R. Bannister, H. S. Edward, J. Foster, R. E. D. Fox, B. H. Gregory, M. J. Littlewood, J. Pritchard, R. M. Scarisbrick, W. B. I. Small, J. E. A. Williams. Graduateship: A. G. Eades, J. O. Frogg, G. W. Gilby, S. C. Kothari, D. H. Latham, B. W. Sneddon. Diploma: J. B. Askew, C. J. Barker, P. Barrand, F. E. Bassford, D. H. Brooke, T. H. Carr, S. E. Collyer, R. Czerniawski, J. R. Davidson, R. G. East, G. Foote, A. E. Gedge, J. H. Golden, D. W. Green, I. Guakil, D. A. Hall, P. J. Hill, P. J. Judd, C. Lee, J. E. Loible, J. W. Longley, M. Mabbs, J. McFadyen, K. J. McSweeney, A. Radcliffe, A. Rutherford, J. Y. Seevaratnam, G. R. Sothern, J. A. Thomson.

Questions Corner—82

(Second Series)

347. Is any pre-treatment of glass fibres necessary when it is being used for the production of reinforced plastics?

348. Polyvinyl acetate is produced in both solid and emulsion forms. Give some account of their properties and uses.

349. Cellulosics are used as binders for a number of materials. Give some details.

350. In referring to polythene reference is often made to its 'melt index.' What is this and what does it indicate?

(Answers next week)

Answers to Questions Corner—81

343. Any process used for pigmenting polythene has to be carefully chosen so as to obtain satisfactory dispersion of the colourant for the application for which the final product is intended. There is a narrow range of temperatures between that at which the mix is molten and the one when it is so fluid that no further breakdown of agglomerates of the pigment can occur.

There are four main methods of pigmenting polythene: 1. When it is necessary to have the best dispersion possible, *e.g.* black compounds with good weather resistance, and compounds with good electrical properties, then the polymer and colourant should be blended, compounded in a mixer or extruder, disintegrated and then used in the final processing such as extrusion or moulding; 2, the blending of the colourant (in the form of a masterbatch) and the polymer, which can then be taken to the final processing, such as a pre-plasticizing injection moulding unit or extruder; 3, dry colourant is tumbled with the polythene and then taken to the final process, *e.g.* injection moulding or extrusion; 4, printing is sometimes used for colour identification, *e.g.* on insulated wires, but the adhesion of the ink to the polymer is not very good.

Of the inorganic pigments, carbon black (channel type) has been found suitable. Anatase or rutile titanium dioxide can be used although the former tends to chalk on exposure, and the latter is slightly yellower than the anatase but does not chalk.

In the organic dyes and pigment group only the toners, vat dyes and pigments are of use with polythene.

344. The principle method used in this country for preforming is based on the process used for the manufacture of felt hats. A weighed amount of flock is deposited by air suction on to a perforated cone and then felted by water before removal and further processing.

The Turner - Atherton machine is based on this type of machine. Glass roving is fed to a hopper which cuts the strands into lengths of 2in. An air stream, which is drawn through the chute and plenum chamber by a fan, deposits the fibre on to a perforated screen. The screen is placed on a turntable which can be rotated and tilted. At this stage the binder is applied and the preform, whilst still on the screen, is taken to an oven to cure the binder. This preform can then be handled and, after being removed from the screen, is placed in a heated metal mould and a quantity of polyester resin poured over it. The press is then closed and the resin is forced into the interstices of the preform where it completes the cure.

Another machine by Brandt Goldsworthy has been developed which is essentially a totally enclosed circuit type in which the air is heated and the curing can be completed without removal of the preform to a separate oven.

The Morrison equipment needs no chamber. A turntable is mounted in a room, at an angle to the floor depending on the size, and the fan inlet is fitted behind the screen. A separate unit consisting of the cutter which discharges into a small blower projects the fibres along a flexible hose. The turntable rotates slowly and the fibres are blown on to the screen, the distribution being controlled by the skill of the operator. The screen consists of a perforated mild-steel plate about 18 gauge, having about 40% of the area open.

345. Polyvinyl chloride is a rigid material unless combined with one or more plasticizers, or co-polymerized with another material which will impart the necessary flexibility. Some polymers by virtue of being low molecular weight polymers have some degree of flexibility and the term 'rigid' is usually used to indicate a polyvinyl chloride polymer which has no plasticizer added, or at least a very small percentage.

The plasticizer, which is usually a solvent for the resin, is relatively non-volatile and remains in the finished product and will exert considerable influence on the physical properties, *e.g.* by increasing the flexibility, affecting the electrical properties.

Plasticizers are classified as primary or secondary, depending on whether they are true solvents for the resin. A primary plasticizer is included in a given formulation and a secondary plasticizer, used as an extender, or to confer some special property. Primary plasticizers include phthalates, phosphates, dibasic acid and polymeric esters, not forgetting the nitrile rubbers which are used where non-migratory characteristics are of importance.

346. Experimentally, the earliest pearl polymerization was carried out in 1931 using acrylic esters. It was found that if these ester monomers are suspended in water, or salt solution, while being strongly agitated, and the mixture warmed with the addition of benzoyl peroxide, pearls were formed. The size of the pearls depending on the degree of agitation (GP 656,134).

The first commercial product was polyvinyl chloroacetate which was polymerized in an aqueous salt solution, in the presence of a soap-like emulsifier. It was used in lacquer formulations and consisted of clear beads about 0.5–1.0mm. diameter (USP 2,109,981; GP 664,351).

Later it was discovered that if certain suspension stabilizers were added to the aqueous phase, this would prevent the polymer beads sticking together and forming aggregates. Gelatin, methyl cellulose, polyvinyl alcohol, etc., have been used (BP 427,494; USP 2,108,044).

Also, it was found possible to obtain similar dispersing effects by adding to the aqueous phase small percentages of water-insoluble, finely divided inorganic substances, *e.g.* talc, barium sulphate (GP 735,284).

Both of these processes have been developed on a commercial scale for preparation of 'pearl' polymers from a variety of monomers including acrylic esters, styrene, vinyl acetate, vinyl chloride and vinylidene chloride and co-polymers of some of these with each other.

Water is seldom used alone but is modified by the addition of suspending agents of various types. The most important of these being water soluble organic polymers and inorganic compounds in the form of water in soluble powders or precipitates. Surface active agents may also be added.

(More questions next week)

'Plastics flow—a contortionist friend of mine'

FURNACE

VULCAN 9 SAF
VULCAN 6 ISAF
VULCAN 3 HAF
VULCAN C CF
VULCAN SC SCF
VULCAN XXX SCF
VULCAN XC-72 ECF
STERLING SO FEF
STERLING S, PELLETEX } SRF
STERLING NS, PELLETEX NS } SRF-NS
STERLING L, STERLING LL } HMF
STERLING V GPF
STERLING 99 FF

CHANNEL

SPHERON 6 MPC
SPHERON 9 EPC
SPHERON C CC

CABOT

the world's only manufacturers of a complete range of Channel, Furnace & Thermal Carbon Blacks

THERMAL

STERLING FT free flowing FT
STERLING MT free flowing MT
STERLING MT-NS free flowing MT-NS

Plants throughout the South-Western United States, in Canada, England and France

Agents in principal cities of the world

London Sales Office

CABOT CARBON LIMITED 62 BROMPTON ROAD, LONDON, S.W.3

Tel: KNightsbridge 7181 (5 lines) — Telegrams Cablak London Telex

Registered Office and Works STANLOW, ELLESMERE PORT, CHESHIRE

MEN *and* MATTERS

A Review of People and Events

by George A. Greenwood

TWO men, whose names and whose records in the industries with which they are associated, are very familiar to all of us, appear in the news in circumstances somewhat outside the ambit of their general activities, but certainly not at all the less interesting.

To begin with there is Sir Ewart Smith, who is perhaps as well known as a scientist as he is an industrialist. In a way he linked both during his long association with Imperial Chemical Industries, and after all he is a former member of The Advisory Council on Scientific Policy. As all his friends know, too, he is very much a practical man of affairs, and it is not surprising, therefore, that in his presidential address to the engineering section of the British Association at York last week, he brought us all down to earth—literally. Sir Ewart dealt, *inter alia*, with space transport, and exploded quite a number of airy-fairy notions that have now become prevalent. He bluntly discounted the idea that trips to the moon are going to be the order of the day within the next year or two, and said that if a human being did land there and come back alive before the year 2,000 he would be very much surprised. But he went farther than that, by declaring that while there is immense potential importance in guided rocket missiles in the military sphere, he is equally convinced that they will play no appreciable role in civil transport for the next 100 years at least.

It does not seem likely, therefore, that two-way traffic between the earth and the heavens is going to make any big difference to the commercial demand for rubber and plastics in your time or mine, at least.

Sir Miles Thomas

The other name is that of Sir Miles Thomas who, I see, is expected to be elected president of Epsom College when the governors meet in London a fortnight hence. Since, I gather, he is the only nominee for the office, and nominations have closed, then presumably his election is a foregone conclusion. It is an interesting prospect in many ways that the chief of Monsanto should be assuming this office, one point incidentally being that he was not at Epsom (he was educated at Bromsgrove School before entering engineering as a premium pupil and becoming eventually one of the great figures in the motor world until the world of chemicals captured him). Although there is a general notion that Epsom College exists, if not exclusively, then at least primarily, to produce men for the world of medicine and surgery, and the Royal Colleges do take a great practical and scientific interest in what goes on at Epsom, it certainly does not follow that all pupils are destined for one or other of these learned professions. In fact, I understand that there is considerable emphasis on science at the school and this is, perhaps, the reason why Sir Miles takes such an interest in its affairs.

British Adhesives for America

Mr H. R. E. Surridge, managing director of Surridge's Patents Ltd., of Beckenham (Kent), leaves London by air on Monday week for the United States upon an interesting mission. New York will be his first stop in a flying export tour for Surridge's 'Holdtite' and 'Titebond' industrial adhesives, and stick-on-soles. The tour will include visits to Venezuela, Trinidad, and Jamaica.

H. R. E. SURRIDGE

Leaving New York on September 27 Mr Surridge will fly to Caracas, Venezuela. On October 3 he is to continue his journey to Trinidad, and will move on to Kingston, Jamaica, on October 7.

Arrangements are expected to be finalized at Caracas for the licensed manufacture by a Venezuelan company of Surridge's industrial adhesives for the South American market. Consultations will also be carried out on general manufacturing processes and the testing of raw materials and finished adhesives. Mr Surridge expects to arrive back in London on October 11.

This strikes me as being the right way to get goods made and put into a wider circulation, and it is, of course, now becoming a general practice. Businessmen seem nowadays to hop into a plane to carry them to the far ends of the earth with no more concern than their fathers boarded a train from London to Glasgow!

Export News

Worthy of note are details of recent export orders placed with Iddon Bros. Ltd. of Leyland, Lancs., which include two heavy mixing mills for Russia and a repeat order for an inverted 'L' four-roll precision calender to be exported to the USA. The latter machine is to be fitted with flood lubricated bearings, hydraulic preloading and a new development to be known as 'hydraulic cushioning' for the top roll. Almost completed in the works is a three-roll calender destined for Portugal, fitted with special equipment to customers' own design.

These, together with many home orders, give every indication of Iddon Bros. maintaining their optimistic outlook for the future.

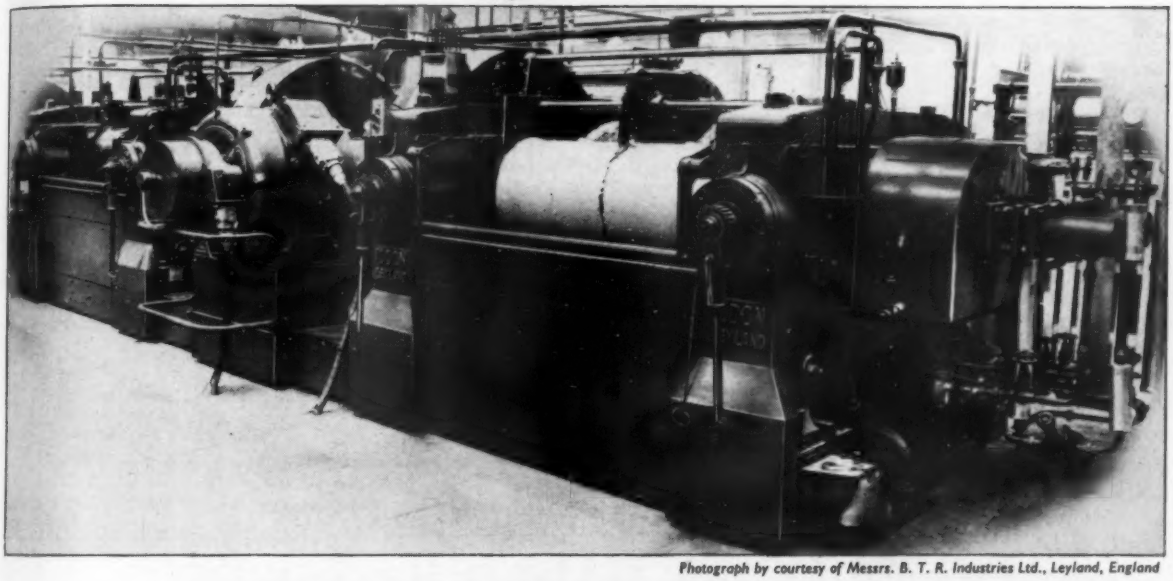
ISR in Southern Africa

H. J. Hornsby, general sales manager of the International Synthetic Rubber Co. Ltd., has just returned from a successful investigation into the synthetic rubber market in Southern Africa.

Acting in liaison with his Company's agents, National Chemical Products Ltd., Mr Hornsby visited established and potential users of SBR in South Africa and the Central African Federation.

There is at present a demand for

This is BIG NEWS!



Photograph by courtesy of Messrs. B. T. R. Industries Ltd., Leyland, England

Once again Iddon's lead the field

Twin Unit Mills

In 1950 IDDON'S produced the first new 22′ x 60′ Mixing Mill mounted on vibro-insulators

In 1959 IDDON'S are again the first to produce a Twin Unit of 22′ x 60′ Mills with central drive and mounted on vibro-insulators

THE CONSULTATION SERVICE OF OUR TECHNICAL STAFF IS FREELY AVAILABLE

IDDON BROTHERS LIMITED

LEYLAND · LANCASHIRE

Telephone: Leyland 81258-9 **Telegrams: IDDON, LEYLAND**

LONDON Representative: Mr. J. Summers, Room 16, 4th Floor, Abford House, Victoria, London, S.W.1 · Telephone: VICtoria 1488

U.S. and CANADIAN Technical Sales and Service:
THE WILMOD MACHINERY COMPANY LIMITED,
28, Jutland Road, Toronto 18, Ontario
Telephone: C.L. 1-2229-0 **Cables: Wilmo, Can, Toronto**

Manufacturers of Mixing Mills, Presses, Calenders and Extruding Machines for Rubber and Plastics Industries

13,000 tons annually of SBR in Southern Africa, and manufacturers insist on reliability and speed of delivery as well as consistent quality. Mr Hornsby was able to guarantee that his company, by virtue of its modern plant, rigorous control and unique position on Southampton Water, was well equipped to satisfy these requirements.

Although shipments of Intol rubber had already been made to Southern Africa, Mr Hornsby was able to arrange additional business, and ISR are looking forward to an increasing share of the expanding market for synthetic rubber.

New Goodyear Appointment

The Goodyear Tyre and Rubber Co. (Gt. Britain) Ltd., Wolverhampton, has just announced the appointment of Mr W. R. Booth as financial

W. R. BOOTH, newly appointed financial director and secretary of the Goodyear Tyre and Rubber Co. (Gt. Britain) Ltd.

director and secretary. He succeeds Mr H. A. Brundage, who has returned to the headquarters of the world-wide Goodyear Company, in Akron, Ohio, to take up another assignment.

Mr Booth, who is 52, was managing director of Goodyear-Cuba prior to his latest appointment. He joined Goodyear in Akron 30 years ago and afterwards served with the company in both Argentina and Brazil. Then, in 1944, he was appointed general operating manager of Goodyear-Great Britain. A year later he moved to Goodyear – Sweden as secretary-treasurer, and in 1947 went back to Argentina as secretary-treasurer of the Goodyear Company there.

A married man, Mr Booth has two grown-up daughters, aged 19 and 21.

Lord Dunsany and Mr L. W. B. Teeling, M.P., have been elected additional directors of the Tremelbye (Selangor) Rubber Co. Mr A. H. Marshall has resigned from the board.

Plastics Pipe Plant for Russia

A licence has been granted to the American Omni Products Corporation to export machinery worth about $1m. to Russia for the production of plastic pipe. When installed, the equipment will be capable of turning out about 20 million lb. a year of rigid and flexible pipe.

Principal supplier of the equipment would be the Plastics Division of National Rubber Machinery Company, Akron, Ohio, according to Omni. When erected, the plant would use Russian-made polythene and PVC.

Large Tank Lining

An acid-resistant lining for a 250,000-gallon holding tank at the Ruabon (Denbighshire) works of Monsanto Chemicals Ltd. is to be installed by Semtex Ltd.

The order, one of the largest of this type placed with Semtex, has resulted from the success of similar linings installed about five years ago at the same factory in two large effluent-holding tanks containing strong acid liquors. The specification was 4½in. thickness of acid resistant shale bricks set in latex/cement over a membrane of latex/cement.

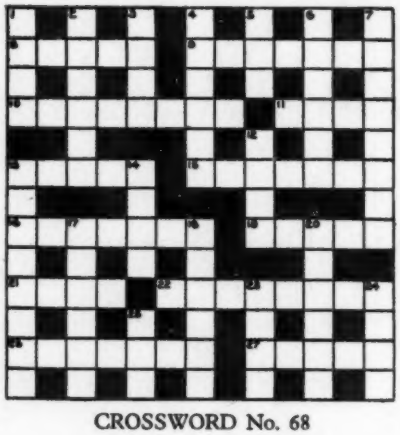
HAPPY BIRTHDAY

Birthday greetings to Dr D. G. Marshall (Physical Research Dept., Dunlop Rubber Co.) for September 1; Mr J. H. Mandleberg, September 2; Mr. J. H. Messenger (Head of Intelligence Division, RABRM), Mr R. C. W. Moakes (RABRM) September 5; Dr F. H. Cotton (National College of Rubber Technology) September 10; Mr B. C. Aldis (British Plastics Federation) September 13; Mr John H. Lord (Dunlop), Dr A. van Rossen and Mr G. Allan (Ioco Ltd.), September 15; Mr G. C. Baker (Perrite Ltd.), Mr R. S. Goy (Textile Research Dept., Fort Dunlop) September 19; Mr D. A. Dew (Barrow, Hepburn and Gale Ltd.) September 21; Mr W. O. Hibberd (R. and J. Dick Ltd.) September 25; Mr Herbert Rogers, Mr C. W. Snelling (Poppe Rubber and Tyre Co. Ltd.), Mr G. A. Shires (Research and Technical Information Service, Dunlop Research Centre) and Mr G. E. M. Godfrey (Silvertown Rubber Co. Ltd.) September 29; Mr A. Fordyce, M.B.E., Mr Harold T. Turnbull (Lintafoam Ltd.), Mr S. C. Parker (Tyre Design Division, Fort Dunlop) September 30.

***Duly authenticated dates for inclusion in this feature will be welcomed by the Editor.*

Mr Derwent Cockbain, technical manager, has retired after 30 years' service with the Redfern group of companies.

RJIP CROSSWORD



CROSSWORD No. 68

CLUES ACROSS

8. Rubber trees developing from buds taken from any one parent tree.
9. An animal starts this colorant.
10. This is used in polymerization processes and 25 down is included.
11. A filler—Bentonite for example.
13. Another resin is used to cleanse.
15. This is taken in retaliation.
16. 21 across for a cable, do cut in again.
19. This is often lost in frightening circumstances.
21. Tube.
22. Inorganic sulphurless vulcanizing agent.
26. This Isle is Ireland.
27. Am I never initially to show an accelerator.

CLUES DOWN

1. Other arcs form a blemish.
2. A famous golfer and tyre cord material.
3. Resistance to this is an important property of vulcanizates.
4. To come into view.
5. Incite.
6. Polytetrafluorethylene.
7. This material can be polymerized using Ziegler catalysts.
12. A chamber in which vulcanization can be carried out.
13. Tyres and successful sportsmen are so treated.
14. A prefix denoting equality.
17. Pinched, *e.g.* between rolls.
18. The design of these is of importance in the road holding characteristics of a car.
20. A dried grape.
23. Dash.
24. Humble.
25. A plasticizer is formed when the deserter returns.

(Solution appears on page 190)

Dusseldorf Plastics Exhibition

GREAT RANGE OF EXHIBITS

THE exhibition to be held in Dusseldorf, 'Plastics 1959' (October 17 to 25) is the third international plastics exhibition to be held in Dusseldorf. It will also be the largest with more than 700 exhibitors displaying their products over a total area of not much less than three-quarters of a million square feet. Exhibitors from some 15 countries ensure that the Fair will be truly international.

In the machinery section, more than 200 companies will have their products on show. Included will be a number of machines specifically designed for or adapted to the latest trends in automatic production, and also for use with the newer materials such as the polycarbonates. Likewise the scheduled range of ancillary equipment is vast and impressive, including welding units, metallizing equipment, moulds, measuring and control instruments and other machines used in converting.

Almost every plastics material and product made in the UK will be represented in the comprehensive combined display organized by the British Plastics Federation in collaboration with the Board of Trade. Ten manufacturers—BAKELITE LTD., BRISTOL AIRCRAFT LTD., BRITISH GEON LTD., BRITISH RESIN PRODUCTS LTD., COMMERCIAL PLASTICS LTD., DURAPIPE AND FITTINGS LTD., EKCO PLASTICS LTD., NOVADEL LTD., PORTLAND PLASTICS LTD. and BERNARD WARDLE (EVERFLEX) LTD.—will be showing their latest products. These include pipes and fittings, battery cases of nylon, reinforced plastics products such as car bodies and cooling fans, conveyor belting and PVC tubing specially developed for vital medical uses.

EKCO PLASTICS are to feature some of their highly successful and award-winning range of domestic ware, such as the 'Superbath,' together with bowls, buckets and bins for kitchen use. The company's industrial products on show will include representative injection and compression mouldings and vacuum formings such as refrigerator door panels, radio cabinets and car fittings.

Among the exhibitors will be Chemische Werke Huls, who employ both emulsion polymerization and suspension polymerization methods to produce PVC, of which they are one of the largest producers in Western Germany. Pictured above are some of the controls for the highly automatic suspension polymerization PVC production plant

Among other exhibits in the exhibition will be household articles, beach shoes, sandals, shoe trees and toys on the stand of BARCLAY STUART (PLASTICS) LTD., of Luton.

FAWCETT PRESTON AND CO. LTD. are to show a laboratory mixer for rubber and plastics having a special rotor and chamber design. A heavy duty, high production extruder of the latest design will also be shown.

Another British exhibitor, WEST INSTRUMENT LTD., Brighton, is to show a range of temperature controllers, indicators, thermo-couples and other control instruments.

Twin screw extruding machines with capacities up to 550lb./hr. in rigid PVC: rigid PVC pipes up to 16½in. diameter, sheets in widths up to 58½in. continuous production, will be shown on the stand of CHEMICA AG., Zurich.

Equipment for the spraying of two-component resin systems, especially for saturating glass fibre mat and cloth with polyester resins is to be seen on the stand of J. COUDENHOVE, Vienna.

There will be a considerable number of injection moulding machines of different types. Included among these are those made by LUDWIG ENGEL AG, Austria, these having screw press plasticization and being suitable for shot weights from 80 to 1,200gms. F.I.M.S.A.I., Milan, exhibits hydraulic injection moulding machines with preplasticization and a patented locking system. Four machines, of which three are new types, will be displayed by MASCHINENFABRIK UND GIESSEREI NETSTAL AG, Switzerland. Included is a vertical machine suitable for the production of mouldings with metal inserts (Model SMV 110/1,000). The Rotomat 1,400/550 has screw plasticization and plunger injection for shot weights up to 1.4kg. Four fully automatic screw injection machines will also be displayed by ECKERT AND ZIEGLER GmbH. These include the Monomat and the Duomat, injection volume 150 to 2,500cc., which have interchangeable injection units and can be fitted with screws of various diameters. Welding equipment displayed will include electric hot air welding equipment for thermoplastic materials with thicknesses of 0.5mm. and more, by KARL LEISTER, Germany. Semi-automatic, pneumatic, high frequency welding machines, shown by MAXINEC INDUSTRIELE APPARATUUR, Holland, have capacities from 100 to 6,000W. W. WEGENER, Germany, is to show folding and welding machines for widths of up to two metres and sheet thicknesses from 1–15mm. and welding tables. GOTTLIEB WIEDMANN, Germany, will exhibit semi- and fully-automatic machines.

DEUTSCHE SHELL AG will be showing for the first time in Germany something of the scope of the company's plastics interests. Exhibits will include a full range of PVC emulsion polymers, straight and copolymers of polystyrene, low pressure polythene, polypropylene and SBR synthetic rubbers. A range of Shell chemicals will also be on display.

DEUTSCHE SOLVAY-WERKE and its parent film, SOLVAY ET CIE, Brussels, are to show collectively with others of the group all types of PVC produced by the group.

REICHHOLD CHEMIE are to demon-

strate potential uses of the synthetic resins they manufacture. These include unsaturated polyester resins, technical phenolic and cresolic resins, urea formaldehyde resins in aqueous solution and a range of surface coating resins.

The polyolefines manufactured by FARBWERKE HOECHST under the name 'Hostalen' will be the centre of the company's display. Included will be a wide range of sample uses of Hostalen polypropylene and special developments in the PVC field. In addition to their established line of fluoro-polymerizates, Hostalen TF, the versatile polytrifluoro-chloroethylene will also be shown.

A new design on the stand of WERNER AND PFLEIDERER will be a pre-mixer with a high speed mixing component. The established internal mixers with floating weight are to be displayed in two sizes for the improved processing of plastics. The plastificator has now been provided with a discharge screw with hot stripping device which replaces the former pelleting device. The twin screw extruder. Type ZSK will be shown for the first time in the size 120/1,500 (screw diameter 120mm., screw length 1,500mm., driving capacity 150kW) as a high output compounding machine.

A continuous preheater and predrier for thermoplastics to be used in combination with extruders and injection moulding machines and a conveying unit for granules, will be on the stand of LABORATORIE TEKNIK BJERREGAARD, Denmark.

A collective stand, giving a good idea of the French plastics industry and representing some 20 French producers and processors, has been arranged by the Union des Syndicats de la Transformation des Matières Plastiques.

IRI News

Australasian Section

Mr G. B. Golding reports that the New South Wales Branch of the Institution has now over 100 members and that meetings are being held regularly each month. A visit to C.S.R. Chemicals Pty. Ltd., a subsidiary of the Australian company Colonial Sugar Refining Company Ltd., was made by 50 members on March 12 last. The April meeting took the form of a symposium on 'Rubber in Footwear.' Mr A. Robinson, Head of the School of Footwear, Sydney Technical College, was chairman of the panel and was assisted by Mr H. C. Cushnie and Mr K. Freeburn. Mr Robinson gave an introductory lecture on the place of rubber in footwear, Mr Cushnie spoke on the non-leather components of modern footwear and Mr Freeburn on the subject of adhesives.

Indian Section

At the tenth annual general meeting of the Indian Section of the Institution which took place at the Great Eastern Hotel, Calcutta, on March 7 1959 Professor S. N. Bose pleaded for research work to achieve progress in the rubber industry. Mr J. Luckham, in his presidential address, said that the rubber industry had been able to overcome many of the hurdles in its way and achieve appreciable progress. They were making this stride quietly and effectively in conformity with the progress of Five-Year Plans. He hoped that the consumption of raw rubber would go up in 1959. This would mean increasing the import of rubber, which would be a drain on India's foreign exchange resources.

Mr Luckham said that plans for increasing the output of rubber in India were there, but these plans, it appeared to them, were not moving fast enough. The principle of establishing a synthetic rubber factory in India had been agreed and it was now largely a question of arranging the necessary finances. When this went into production, it would help to fill the existing void.

He urged technicians to help the industry to improve the quality so that goods exported from India might stand the competition in world market.

Dr D. Banerjee, honorary secretary, presented the annual report and Mr H. Shepherd, honorary treasurer, the accounts.

Leicester Section

A party from the Leicester Section of the Institution of the Rubber Industry visited the National College of Rubber Technology on Friday June 12 1959. The visitors were welcomed by Dr F. H. Cotton, the principal, who explained the origin of the College, its present work in the training of high polymer scientists and technologists, and its hopes for the future.

Preston Section

The Preston Section of the Institution of the Rubber Industry held its annual social evening at the Becconsall Hotel, near Southport, on June 19 when members and friends, together with invited guests including E. Morris and L. D. Gill, vice-chairman and secretary, respectively, of the Manchester Section, sat down to the evening meal. This was followed by the Bowling Handicap for the Iddon Cup. After many interesting ends the final was played between R. Barnes of the Leyland and Birmingham Rubber Company and C. Holt of BTR Industries. Mr Barnes, the winner, was persuaded to add to the entertainment of the evening by performing some of his conjuring tricks. Prizes were presented by the chairman, Mr G. H. Pearson (BTR) these having been donated by manufacturing firms in the area.

OBITUARY

G. H. REDMAN

George Herbert Redman, managing director of J. E. Baxter and Co. Ltd., Leyland, Lancs., died on September 6 aged 76 years.

Mr Redman had been managing director of the Company since 1917. He joined in 1909 and had only recently completed his 50th year with the Company. Previously, from 1903-1909, he was with the Leyland and Birmingham Rubber Co. Ltd. He was a member of the original Chemical Warfare Committee and in that connexion had much to do with the associated respirator assembly factory. Mr Redman, who leaves a widow, received the O.B.E. in 1920 for his work in World War I and the C.B.E. in 1941 for public services.

A leading figure in the North-West, he had represented Leyland on the County Council since 1943, and became an alderman in 1955. He served on a number of committees including the Leyland Development Joint Standing Committee, the Highways and Bridges Committee and the Divisional Health Committee.

A J.P. for 28 years, Mr Redman was chairman of Leyland Magistrates until his retirement at the age of 75. He was also a committee member of Preston Quarter Sessions Magistrates' Association, chairman of the Lancashire River Board from 1951-57, and a member of the Ministry of Transport's Appeals Tribunal. He was a Freeman of the Cities of London and Lancaster.

Mr Redman was educated at Rivington Grammar School and Owen's College, Manchester.

Anglo-American Plastics Ltd. (one of the Commercial Plastics group of companies) have moved to larger premises at 45-47 Wigmore Street, London, W.1 (Telephone: Welbeck 4171).

A COMPREHENSIVE RANGE OF REINFORCEMENT

SILICATES

FRANTEX B-1
THE WIDELY USED STANDARD

FRANTEX B-2
LESS DARKENING THAN B-1

NEOFRANTEX
FOR NEOPRENE, VERY HIGH PHYSICALS

FRANTEX-BUTYL
FOR BUTYL RUBBER

CLAYTEX
THE CHEAPEST ACTIVATED ALUMINO-SILICATE

SILICAS

FRANSIL
A PURE REINFORCING SILICA UNIQUE IN SPHERICAL PARTICLE SHAPE WHICH COMPOUNDS TO HIGHER LOADINGS THAN PRECIPITATED TYPES. PROCESSING IS REMARKABLY FACILE WITH LITTLE TENDENCY TO DUST NUISANCE. THE MIX DOES NOT DRY UP AND THE STOCKS REMAIN EASILY HANDLE-ABLE. NO COMBINED WATER. CHEMICALLY NEUTRAL.

FRANTEG
A CHEAPER OFF-WHITE VARIETY OF THE ABOVE WITH SIMILAR PROPERTIES

WITCO CHEMICAL CO., LTD.

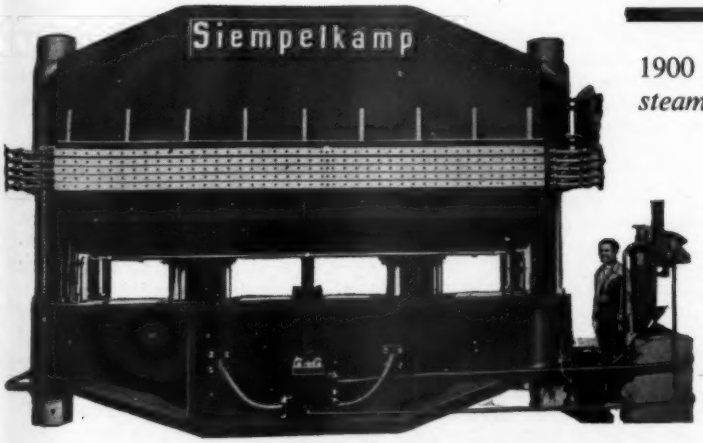
Head Office: **BUSH HOUSE, ALDWYCH, LONDON, W.C.2**
Telephone: TEMple Bar 6473/6476

PEARL HOUSE, PRINCESS ST., MANCHESTER 2 (Central 9066/8) 62 ROBERTSON ST., GLASGOW C.2 (City 3495)

Works at: **UNION LANE, DROITWICH SPA, WORCESTERSHIRE**

Also at · NEW YORK · CHICAGO DETROIT AKRON · BOSTON · CLEVELAND

MULTI-DAYLIGHT PRESSES



1900 ton 6-Daylight Press by Siempelkamp steam platens 12′ 6″ x 7′ 9″; two 25″ dia. rams, with self-contained Pump Unit.
(AS ILLUSTRATED)

800 ton 6-Daylight Press, platens 40″ sq.; ram 34″ dia.; working pressure 2000 lbs. p.s.i.

450 ton 5-Daylight Press by John Shaw, platens 54″ sq.; ram 24″ dia.

450 ton 8-Daylight Press by Latex Engineering, platens 36″ sq.; rams 24″ dia.

✦

REED BROTHERS
(ENGINEERING) LIMITED
Replant Works, Woolwich Industrial Estate, London, S.E.18

Telephone: 7611-6 *Telegrams: Replant, London, S.E.18*

Review

TECHNIQUES OF POLYMER CHARACTERIZATION.—P. W. Allen, B.A., D.Phil. (Editor), pp. xiv + 256. (Butterworths Scientific Publications, London, 1959, price 50s., post 1s. 6d. extra. The American edition published by Academic Press Inc., New York, at $9.50.)

Butterworths seem to have a happy knack of turning out each volume in their polymer series in the form of a standard reference work on a specific aspect of the subject. The present book maintains this high level despite its resulting from the collaboration of eight authors and much credit must go to Dr Allen who has clearly taken great pains to unify the presentation and prevent undesirable overlapping of subject matter. Chapters on The Fractionation of High Polymers (R. W. Hall), Number-Average Molecular Weights by Osmometry (H. T. Hookway), Other Methods for the Determination of Number-Average Molecular Weights (D. F. Rushman), Light Scattering Techniques (F. W. Peaker), Viscometry (P. F. Onyon), Techniques of End-Group Analysis (G. F. Price) and The Characterization of Block and Graft Copolymers (R. J. Ceresa) are prefaced by an Introductory account of the behaviour of polymer solutions (P. W. Allen) which also serves to present a number of concepts common to all the topics which are to follow, so enabling each author to reduce his account of the theoretical background of a method to an absolute minimum.

This is a practical book intended for those commencing or extending research into fields which require the determination of the molecular weights of polymers. It is a mine of information concerning equipment and methods and while obviously reflecting the author's own preferences and experience, the critical treatment of such subjects as osmometer design will obviously be of enormous assistance to any worker who is faced with choosing a suitable instrument for a particular determination. The index is short but adequate in view of the sectional nature of the treatment and each chapter is adequately referenced. Diagrams are clearly printed and careful attention seems to have been given to proof-reading and printing, the mathematical symbols in particular. If there is need to criticise, a small point concerns the title which is defended strongly by Dr Allen (p. 2) but which appears to be rather too general in view of the omission of important topics such as determination of spatial arrangement, estimation of cross-linking and many other structural features. This may disappoint some potential buyers who will be further discouraged by the omission of some of the text in the second paragraph of the blurb on the dust-cover. For the majority, however, the determination of the molecular weights of polymer molecules together with some information as to the distribution of molecular weights in the mass is sufficient characterization and in this respect, the title is therefore justified.

Summarizing, this book should form part of the essential equipment of every laboratory concerned with the physical chemistry of high polymers, it can be recommended without reserve to post-graduate students commencing their research and to final year Associateship or Graduate students. It should be added that although the level is beyond, for example, that of the current API 'Physical Chemistry of High Polymers' syllabus, nevertheless, the model presentation of many chapters is deserving of study on its own account.

—D.A.S.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

Colonel F. T. Davies has been elected president of the International Rayon and Synthetic Fibres Committee. He succeeds M Jean de Precigout. Colonel Davies is a director of Snia Viscosa and of a number of other companies.

NEW THERMOPLASTIC

Chlorinated Polyether

Described as an entirely new chemically inert thermoplastic material, K.51 is a chlorinated polyether derived from pentaerythritol, and possesses an unusual combination of properties for a thermoplastic, including excellent mechanical strength, high temperature resistance, exceptional chemical resistance and extremely good dimensional stability.

The new product, now in the range of engineering plastics put out by Polypenco Ltd., is inert to almost all alkalis, solvents, chlorides, and inorganic acids. It is also completely non-hygroscopic and possesses excellent outdoor weatherability.

K.51 is stated to be a comparatively rigid form stable material, having a tensile strength of 6,000 psi and a Rockwell hardness of R100. It has high resistance to deformation under load and very low cold flow tendency compared with fluorocarbons. Whilst K.51 heat distortion temperature is in the same general range as Nylon 66, it can be subjected to continuous operating temperatures from 120°–130°C. in an oxydizing atmosphere. Electrical insulating properties are said to be good. The new material is available in a wide range of extruded shapes which are readily machineable.

Drying and Mixing

NEW PROCESS FOR RAW RUBBERS

A NEW process, which permits the mixing and dewatering of raw rubber in a single operation, is reported from America. The process, is understood to employ a special Banbury mixer, in which the drying of the rubber, as precipitated from the latex, is carried out by intense shearing action, after initial dewatering by the pressure of the ram, which forces some of the water out of the slurry. The shearing action of the Banbury rotors develops high internal heating, so that the water in the rubber is heated above its boiling point, and is driven off as steam. While this is taking place, compounding ingredients such as carbon black or oil may be incorporated. The process is claimed to be successful for the processing of both natural and synthetic rubbers and is especially applicable to emulsion-polymerized synthetic rubbers. It has several advantages over present methods, in-and with more control over Mooney plasticity than current oven dryers. Savings of £2—£3 per ton in synthetic rubber manufacture are claimed to be obtainable. The inventor of the process is Dr P. J. Dasher, and The Patent and Licensing Corporation, a subsidiary of the Flintkote Co., New York, is licensing it.

Dr Dasher, as assignor to the Dasher Rubber and Chemical Co., has been issued with US Patent No. 2,854,426, which was published on September 30 1958, and which relates to a process of milling synthetic rubber coagulum containing water.

A further item of interest is that the Farrel-Birmingham Co. Inc., is advertising a Banbury mixer for dewatering, which is claimed to produce 6,000lb. of dry rubber per hour. It is believed that with larger Banburys output may be increased to 12,000lb. per hour.

The offices and works of Ferguson Shiers Ltd., Phoenix Mills, Failsworth, Manchester, will be closed on the following dates: Autumn, September 12-15 inclusive. Winter, December 25-28 inclusive.

Plantation Commentary

RUBBER RESEARCH PROGRAMME

by our Malayan Correspondent

THAT humble man of the rubber industry, the rubber tapper with his tapping knife (which has changed very little since Ridley devised it) and his bucket of latex is the man who has been interesting Sir Geoffrey Fletcher Clay, the head of the Malayan rubber industry's research programme. He believes that the way he goes about his job and the way it is done is a likely area of investigation in these times when labour costs are of immense importance to the natural rubber industry.

'The average tapper of today is having to work harder as the result of the development of higher yielding material,' he said. 'Where an acre of rubber produced 400lb. of rubber before per year it can now be made to produce 1,200lb. which means that the tapper virtually has to make three times as many trips a day with latex bins.'

Operational research, said Sir Geoffrey, would help to ease working conditions. Some form of mechanization might be necessary.

He would not say how far mechanization of the rubber industry could go but the research should be aimed not at putting the tapper out of a job but at simply helping him with it. The Blackman report had advocated operational research into the better utilization of the labour force and he felt that there was a very good case for it.

Speaking of his impressions since his arrival here, Sir Geoffrey said that he had been pleased to note the amount of liaison which existed between the commercial research units. 'We cannot afford to keep too many secrets from each other or we may find that the various private enterprise stations are just covering the same old ground that has been trodden before,' he said. He hoped that this co-operation could be increased.

Technical Properties

It is likely in the future that much more of Malaya's rubber will be sold on technical properties rather than the visual grading system says the 'Planter's Bulletin,' a magazine produced by the Rubber Research Institute. It agrees that at the moment a large proportion of Malaya's rubber is sold on the visual grading system.

But already limits had been set for the amount of copper and manganese that could be tolerated and suggestions had been made for the inclusion of other specifications. The editorial went on, 'We believe that additional technical requirements should not be grafted on to the existing grading system but should be included in an all-embracing system of technical classification. The customer is always right and if the user wants to buy his rubber by technical specification the producer must find ways of fulfilling the demand.'

The editorial points out that it is not generally realised that almost a quarter of Malaya's total output of rubber is sold according to technical qualifications.

The major portion of this is latex concentrates. The editorial adds, 'The specifications laid down at an early date for latex concentrates have ensured production of a high quality material which has nevertheless been improved during the last year or two by the introduction into our latex factories of the standards of cleanliness adopted in the milk industry.'

'Speciality Rubber'

Also in the natural research field, the Minister of Commerce and Industry, Mr Tan Siew Sin, said here in the Federal Legislative Council that experts were now attempting to develop a 'speciality rubber' to compete with speciality synthetic rubber for specific purposes.

The special processing rubbers that had been developed by the Rubber Research Institute were a good example of this kind of development.

Speaking of polyisoprene, the Minister said that it was thought that the invention and production of polyisoprene would not have a serious effect on natural rubber provided that the price of natural was competitive.

'It has yet to be demonstrated that the claims of the manufacturers that it possesses all the qualities of natural rubber are true,' he said.

Indian Advisory Service

A technical advisory service for India may be started by the Natural Rubber Development Board said Mr J. E. Bush, the manager in Malaya, after his return from a visit to India where he surveyed the rubber industry. Mr Bush said that the idea was being considered as an extension of the board's activities in Australia, New Zealand, South Africa, the United States and Britain.

The service would be similar to the one that had been provided in Malaya and the Indian scheme was particularly significant in view of the fact that India, with its plans for rapid industrial expansion, would offer a very substantial market in the future for Malayan rubber. There were at the moment two large manufacturing associations for rubber goods in India with a total of more than 170 manufacturing members.

Mr Bush said that the Indian manufacturers turned out a complete range of rubber goods from giant tyres to pencil erasers and there were many aspects of the industry there to which the board felt that it could be useful.

'It is now many years since India was self-sufficient in its supply of natural rubber and so she has to import fairly substantial quantities from abroad,' he said. 'By far the greater proportion of her imports recently have come from Malaya. It now remains to be seen in the light of what I have learnt from my visit how we can best assist the consumption of Malayan natural rubber.'

India's total annual consumption of rubber had now reached 35,000 tons and it was foreseen that by 1960 it would rise to 45,000 tons. If there was another five-year plan it might well reach 100,000 tons but one of the main difficulties facing the Indian manufacturer was the question of foreign exchange to buy chemicals, machinery and raw materials.

Plantation 'Closed Shop'

Malayan employers have reacted strongly to a proposal by the National Union of Plantation Workers that there should be a closed shop in the planting industry. There will not be, the employers have made it clear, as long as they have any say in it.

The union, which claims to represent 320,000 estate workers in the Federation, proposed that the Malayan Planting Industries Employers' Association should co-operate with a closed shop system and that the employers should collect the monthly dues for the union. The union has never, however, stated how many of the rubber workers are union members and estimates differ.

The president of the union, Mr S. P. S. Nathan, said, 'A group of unorganized workers is always a threat to the security of the country.

'Once they are members of the union we can always keep in touch with them. We will be able to feel their pulse and make sure that no undesirables are in our midst.'

The union is the first in Malaya to ask for a closed shop and a 'check off.'

But Mr R. G. D. Houghton, of the Malayan Planting Industries Employers' Association, said that a closed ship in Malaya would be illegal because according to the Employment Ordinance no employer could restrict a worker from joining the union of his choice.

He added, 'In no circumstances whatsoever will the MPIEA ever agree to differentiate between a union and a non-union member. To us they are all workers and they are all paid for the job they do.' Workers on rubber estates would all be paid the same whether they were union members or not.

COMPANIES in the NEWS

Metal Box Co. Ltd.

Continued expansion of the plastics group of the Metal Box Co. Ltd. is reported by the chairman, Sir Robert Barlow, in his annual review. During the year they had introduced new plastic films of low gauge and exceptional clarity; these had been widely accepted by the trade, particularly for packing textiles and knitwear. Production of polythene squeeze bottles had expanded very rapidly. The small factory at Ruislip which they had purchased when they entered the business was no longer adequate for their needs; new centres of bottle production had been created at Portsmouth and Speke, and the Ruislip factory would shortly be closed. The third plastics factory at Portslade, which was concerned with injection moulding and the assembly of aerosol valves, was also nearing the limit of its capacity and would require to be extended in the near future. Agreement had been reached in principle with the Plax Corporation of America, whereby their company would have access to their know-how in the field of blown plastic containers and be able to utilize, as appropriate, their manufacturing equipment.

Distillers Co. Ltd.

In his statement circulated with the report and accounts of the Distillers Co. Ltd. for the year ended March 31 1959, Sir Graham Hayman, chairman, included the following on the Plastics Division:

'The slight recession experienced by many sections of the plastics industry in the early months of last year gave way to a marked improvement in demand, with the result that our sales for the year were in excess of those of the previous year, and we have maintained our position in home and overseas markets. Foreign competition was active, however, resulting in lower prices, which narrowed profit margins.

'Further expansion in productive capacities has been authorized to meet the anticipated growth in demand for our materials for new industrial applications. In this connexion, our Consumer Research Laboratories continue to make valuable contributions.'

Viceroy Manufacturing Co.

Viceroy Manufacturing Co. Ltd., producer of a wide variety of rubber and moulded plastic products, is enjoying improved earnings this year despite a sales decline of about 1%, according to D. W. Buchanan, secretary-treasurer. Net profit of company for the twelve months ended February 28 1959 was $135,098 compared with $73,807 the year before.

Chief reason for the disappointing trend in sales are increasing foreign and domestic consumption and delays in the completing and marketing of new lines. Japanese penetration of the toy field, Viceroy's largest single line, is a major cause for concern, however, and Government action is being sought to alleviate this situation. No major capital spending is anticipated in the near future, said Mr Buchanan, and present working capital of some $1,000,000 is ample.

British Standards

Fireman's Axe with Rubber Insulated Handle (BS 3054: 1959). Prepared with the active collaboration of the Fire Services and the Home Office Factories Inspectorate, this new 12-page publication specifies the dimensions, quality, finish and performance of axes with rubber insulated handles. Although primarily intended as a 'purchasing blueprint' for the Fire Services, the specification will be equally useful to all others concerned with fire and safety precautions.

The standard has been prepared with the safety of user personnel also very much in mind, since certain tests to be carried out both during manufacture and on the finished tool are mandatory, and are designed to make absolutely certain that the thickness of insulation, which must be of the highest quality, is adequate at all parts of the handle. On completion the axe must withstand an insulation breakdown test of 20,000V. A Foreword warns that the insulated axe is not intended for deliberate use on live circuits; but is to be regarded as a tool giving an added degree of safety should a live circuit be accidentally contacted.

Copies of this Standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1. Price 4s. Postage will be charged extra to non-subscribers.

Columbian Carbon Europa

The £2m. carbon black plant now being built near Milan, Italy, by The Columbian Carbon Company, will have production facilities for over 60m. lb. of carbon black annually. It is expected to be in full operation early in 1961. Three grades of carbon will be produced in the new plant: two tread blacks and a carcass black.

Export Opportunities

Polythene Sheets for the US

Barnard Stamp Co., 310 Olive Street, St. Louis, Missouri, have informed the British Consulate at St. Louis that they wish to receive quotations from UK manufacturers of polythene sheets used to produce stencils. A sample of the polyethylene sheeting is available for inspection in Room 620 at this branch until seven days from the date of this circular. It will then be available for loan in order of receipt of applications.

Manufacturers interested in this enquiry should write direct to Mr B. F. Venker, of the Barnard Stamp Co., enclosing samples and quoting prices cif Chicago and/or New Orleans in US dollars, and they should copy their initial correspondence to the British Consulate, Commercial Department, Shell Buildings, 1221 Locust Street, St. Louis 3, Missouri.

Call for Tenders

Pneumatic Tyres

Issued simultaneously by the Ministry of the Belgian Congo and Ruanda-Urundi, Brussels, and the Government General, Leopoldville (493/41/63/59) are requirements for pneumatic tyres for the Belgian Congo to an estimated value of B.Frs. 24 million. Closing date is September 25 1959.

Copies of the complete specification may be obtained upon application to the Service des Approvisionnements du Ministere du Congo Belge et du Ruanda-Urundi, 1 rue de la Regence, Brussels, for B.Frs. 50. No further information about this call for tenders is available from the Export Service Branch of the Board of Trade, but a copy (in French) of the 'Cahier General des Charges' (general conditions of tender issued by the Government General) may be inspected in Room 620. B.o.T. reference number ESB/20612/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

MARLEY TILES
More than seventy-five of the Marley Tile Co. fleet of delivery vans now have their bodywork moulded entirely in polyester/glass. The company builds its own van bodies, using Cellobond polyester resins and glass fibre supplied by British Resin Products Ltd.

We supply..

- NATURAL AND SYNTHETIC LATEX COMPOUNDS

- Pre-Vulcanised Latex
- Reclaim Dispersions
- Colour Dispersions
- Vulcanising Dispersions

RL

RUBBER LATEX LTD. Harling Road, Wythenshawe, Manchester.

Telephone: Wythenshawe 3226/7/8. Telegrams: Compounds, Manchester.

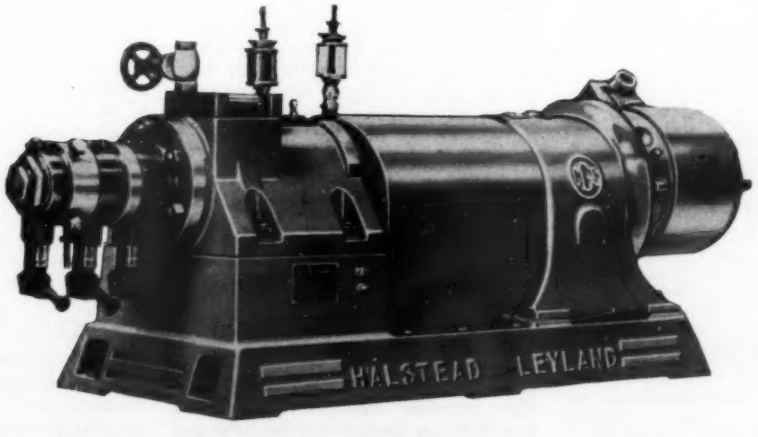
London Office: St. Dunstan's House, Idol Lane, London E.C.3. Telephone Mansion House 1005.

HALSTEADS ENGINEERS (Leyland) LTD

LEYLAND, LANCASHIRE

Telephone : Leyland 81529

Rubber and Plastic Engineers



1½" bench type rubber extruding machine with electrically heated extension and die head

Rubber Statistics

WORLD POSITION AT THE END OF JUNE

THE latest Press release issued by the Secretariat of the International Rubber Study Group sets out the world rubber position at the end of June. The following preliminary figures, which are expressed in 1,000 long tons, compare the position at the end of February with that obtaining a year previously.

NATURAL RUBBER

	June 1959	Jan./June 1959	Jan./June 1958
Production ..	165.0	982.5	900.0
Consumption ..	182.5	1,052.5	975.5
		Change since Jan. 1, 1959	
Stocks at June 30:			
In producing areas ..		267.5 — 25.0	
In consuming areas..		210.0 — 7.5	
Afloat		202.5 — 22.5	
		680.0 — 55.0	

It is clear from the above table that, as was the case during the first half of last year, consumption of natural rubber is again outstripping production, according to the published statistics. This is attributed to the large purchases which have been made in recent months by Russia. The June consumption figure quoted above includes imports into the USSR of 28,750 tons, and into China of 2,750 tons, the latter total including only exports from Ceylon and Malaya.

During the six-months' period estimated imports into the USSR totalled 117,500 tons, while those into China totalled 53,500 tons, making a combined total of 171,000 tons. This figure represented 31% of all natural rubber consumed during this period; during 1958, exports to these two countries accounted for 18% of the world's consumption of natural rubber.

Synthetic Rubber

The synthetic rubber position is set out in the following table:

SYNTHETIC RUBBER

	June 1959	Jan./June 1959	Jan./June 1958
Production ..	112.5	700.0	565.0
Consumption ..	130.0	732.5	592.5
		Change since Jan. 1, 1959	
Stocks at June 30 ..		247.5 — 10.0	

The Study Group points out that the figure for synthetic rubber production during the first half of this year does not include synthetic rubber produced in this country or in Italy. Compared with last year, production and consumption both went up by about 24%.

US General Position

The United States Department of Commerce has issued the following preliminary statistics for the month of June:

NATURAL RUBBER

Consumption: 47,786 tons, of which latex 5,622 tons.

Stocks: 84,727 tons, of which latex 11,063 tons.

SYNTHETIC RUBBER

	Production	Consumption	Stocks
S-Type ..	87,221	76,065	145,486
Butyl ..	5,583	5,484	11,128
Neoprene	10,216	7,083	14,986
N-Type ..	3,696	3,063	7,969
	106,716	91,695	179,569

Total new rubber consumption during June amounted to 139,481 tons, compared with a total of 113,392 tons during May. Natural rubber accounted for 34.26% of total new rubber consumption in June as against 34.20% in May.

During the first half of last year, the United States consumed 636,580 tons of natural and synthetic rubbers combined, compared with a total of 795,462 tons for the first six months of this year, this latter figure representing an increase of 25%.

North Borneo and Sarawak

The Study Group has issued details of rubber exports from these two colonies during the second quarter of the year.

In the case of North Borneo these amounted to 5,067 tons, compared with exports of 5,673 tons during the first quarter to give a total for the half year of 10,740 tons; the comparable total for the first half of 1958 was 9,503 tons. Of the 1959 exports, 3,691 tons went to Japan, 3,141 tons to Singapore, and 1,531 tons to the United Kingdom. Western Germany received 569 tons, and Hong Kong 498 tons, while smaller quantities were taken by the USA, Canada and Italy.

Sarawak's exports of rubber totalled 10,340 tons in the second quarter, compared with 8,109 tons in the first quarter, giving a figure of 18,449 tons for the half year compared with 16,867 tons during the first half of 1958. Of the 1959 exports, 15,859 tons or some 86% went to Singapore. Of the remainder, 1,545 tons went to Japan and 950 tons to Hong Kong.

Bintex in Nairobi

In connexion with a furnishing contract obtained by Hutchings Biemer Ltd., their Distributors in British East Africa, Bintex Ltd. of Harrogate have recently shipped 300 Super Foam latex mattresses for use in the New Stanley Hotel in Nairobi.

The company's latex foam cushioning is also being used in the furniture.

Patent Specifications

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Elastic Fabric

No. 811,308. Ansonia Mills Inc. Application and Filed, July 28 1955. Application in USA, September 2 1954. Published, April 2 1959.

An elastic woven fabric contains uncovered rubber weft threads with exposed portions raised above the surface of the fabric on one side only of the fabric, the exposed portions being disposed in closely spaced wales. The elastic fabric is for use as a body fabric, the exposed portions of the uncovered rubber threads having a high coefficient of friction with the human skin. Covered rubber weft threads are used in combination with the uncovered rubber threads, the covered wefts passing alternately over and under the successive warps to form the major part of the main body of the fabric and to provide substantially all the exposed low friction or fair surface of the fabric. The construction of the fabric is such that it is flat-lying as a whole when relaxed.

Shorter Abstracts

Conveyor Belting. 810,841. Greengate and Irwell Rubber Co. Ltd. Filed, February 25 1957.—A composition suitable for use in making conveyor belting comprises plasticized PVC, nitrile rubber and electrically conductive carbon black. The composition is anti-static and fire-resistant.

Copolymers. 811,037. Air Reduction Co. Inc. Filed, May 17 1956.—The invention is for copolymers of 2,2,2-trifluoroethyl vinyl ether and a vinyl ester of a carboxylic acid.

Vulcanization of SBR. 811,140. Hercules Powder Co. Filed, June 14 1957.—SBR is vulcanized by means of a combination of sulphur and a di(aralkyl) peroxide of a specified general formula.

Antiozonant. 811,220. United States Rubber Co. Filed, October 28 1957.—Ozone cracking of natural rubber or SBR is minimized by incorporating in the rubber a combination of a N-alkyl-N^1-phenyl-p-phenylenediamine and a microcrystalline wax.

Aircraft. 811,477. Goodyear Aircraft Corporation. Filed, January 7 1957.—The fuselage, wings, empennage and pilot's seat of an airplane are inflatable, a rigid framework and other rigid components being provided. The inflatable parts are made of rubberized

---

A. Boake, Roberts and Co. Ltd., have reached agreement with Archer-Daniels-Midland, the Minneapolis chemical concern, for the exchange of knowledge in the field of epoxized chemicals. The exchange covers research, development, manufacture and use.

Rubber Markets

LONDON

Nearby positions recorded gains but distant positions lost ground in the London rubber market during the week. The rise in nearby positions reflected the persistent shortage of early supplies of rubber and the Spot was rather nominally quoted at 33d. per lb. which is around 1¼d. higher on the week. Gains of around ¼d. are recorded in nearby positions but falls in distant positions extend to about ¼d. per lb.

Latest prices are as follows:

No. 1 RSS spot: 32¾d.–33¼d.

Settlement House:

October 31¾d. nominal.
October/December 31¼d.–31⅝d.
January/March 29⅞d.–30⅛d.
April/June 29d.–29¼d.
July/September 28¼d.–28⅜d.
October/December 28d.–28⅛d.

No. 1 RSS cif basis ports:

September 31⅝d.–31⅞d.
October 31⅛d.–31⅜d.

Godown:

Sept. 109¼ Straits cents nominal.

LATEX

Centrifuged latex per gallon in drums, October shipment, 18s. 8d. seller, cif European ports. Spot, seller, 19s. 4d. Bulk, 18s. 9d. delivered works. Creamed, seller, 18s. 2d. Normal, seller, 14s. 5d.

AMSTERDAM

The Amsterdam rubber market ruled as follows on September 7:

	Guilders per kilo	
No. 1 RMA	Sept. 7	Previous
September	3.06	3.06
October	3.04	3.04
November	3.04	3.04
December	3.04	3.04
October/December ..	3.06	3.06
January	2.96	2.96

Sales: Nil Tendency: Quiet

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on September 7 was 154¼ (142) Ceylon cents per lb.

SINGAPORE

Prices were marked up at the outset on September 7 on short-covering induced by the Laotian situation and steadied further on good buying interest and fair enquiry for lower sheets. Malayan August shipment figures at 99,889 tons (July 108,134 tons), although lower, were considered bullish taking into account an estimated 7,000 tons delayed into early September. The market ruled quiet for most of the afternoon at slightly below the day's best prices. The turnover was average. Further short-covering was balanced by profit-taking. There was selective buying interest for lower sheet. Sellers were offering unwanted grades. Afterhours, the market was steady but quiet.

	Straits cents per lb., fob Malayan ports to open ports	
	Close	Prev. Close
Nc. 1 RSS, Sept.	112 –112¼	110 –110¼
Oct.	109¼–109½	107½–107⅝
No. 2 RSS, Sept.	110½–111	109 –109½
No. 3 RSS, Sept.	109½–109¾	108 –108⅜
No. 4 RSS, Sept.	107½–108¼	105½–106½
No. 5 RSS, Sept.	105½–106¼	104 –104½
No. 1 RSS, Spot	112¼–112⅜n	110¼–110⅜
No. 3 blanket, thick, remilled, Sept.	105 –107	103½–105½
No. 1 fine pale crepe, Sept. ..	120½–122½	117½–119½
2x thin brown crepe, Sept. ..	104½–105½	103 –104

Tendency: Steady—quiet

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rec. drums fob at 212.80d. per gallon.

NEW YORK

The New York rubber market ruled as follows on September 8:

DEALERS' PRICES

	Ex-Dock, US cents per lb.	
	Sept. 8	Prev.
No. 1 RSS, Sept. ..	39⅛n	40⅛n
Oct. ..	38⅛n	39⅛n
No. 2 RSS, Sept.	39⅛n	40⅛n
Oct. ..	38⅛n	39⅛n
No. 3 RSS, Sept. ..	39⅛n	40n
Oct. ..	38n	38⅞n
No. 1 RSS, Spot.. ..	40n	41n
No. 3 Amber blanket crepe, Nov.	37n	37⅛n
No. 1 Latex, thin crepe, Sept.	38⅛n	39⅛n
No. 1 Latex, thick crepe, Sept.	39n	39⅛n

FUTURES—REX CONTRACT

	US cents per lb.	
	Close	Prev. Close
Sept. ..	38.50n	40.00b—41.00a
Nov. ..	37.65b—37.75a	38.40t
Jan. ..	35.75b—35.90a	36.45b—36.50a
March ..	35.00b—35.30a	35.55b—35.68a
May ..	34.50t	35.06t
July ..	33.90b—34.15a	34.40b—34.60a
Sept. ..	33.60b—33.85a	34.10b—34.30a

Sales: 97. Tendency: Easy

Rubber futures after early steadiness weakened on trade and commission house selling on September 8, influenced by the decline in the stock market and the fact that Congress passed the Independent Office Appropriations Bill. Traders said there was much uncertainty how the GSA would handle the disposal of rubber from the stockpile and this brought selling into the market. The distant months were the weakest. Prices were off about a cent for the day in a moderate volume of trading. In late trading the loss in rubber futures was pared by covering. The volume of dealings for the day was moderate. Physical rubber was soft and quieter.

DJAKARTA

The market was still handicapped on September 7 by the effects of the monetary reforms. One broker firm made some transactions for Sheet No. 1 at 26½ rupiahs, the turnover being three tons, while during the morning hours the price was quoted between 25 and 26 rupiahs. The turnover for Sheet No. 2 and No. 3 totalled one ton each and for browns No. 1, No. 2 and No. 3 five tons each. The market closed quiet.

	Rupiahs per kilo	
	Sept. 7	Prev.
Spot No. 1 Priok	25.00–26.50n	34.60b
Spot No. 2 Priok	24.50n	33.80b
Spot No. 3 Priok	23.50n	33.70b
No. 1 fine pale crepe, spot ..	20.00n	31.75b

Tendency: Quiet

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on September 7 was 35.75 (35.75) US cents per lb.

Silicone Rubber Price

Midland Silicones have announced a further reduction in the price of Silastic LS-53, a fluorinated silicone rubber which is serviceable from −60°C. to over +200°C. This new price cut of 10% is in addition to two other price reductions which have taken place since October last, making a total reduction of a third since then.

Since its introduction to the UK market in 1957 it has met the need for a heat-stable rubber for use in the aircraft and other industries where rubber parts are exposed to oils, fuels and hydraulic fluids at extreme temperatures.

Effective as from September 9 1959 the prices of Silastic LS-53 were reduced to:

1–9 lb. lots ... 185s. per lb.
10–99lb. lots ... 180s. per lb.

Canadian Asbestos

Shipments of asbestos from Canadian mines in July increased to 94,898 tons from 87,377 a year earlier, placing the January-July total nearly 18% ahead of a year ago at 566,995 tons versus 482,309. Mines in Quebec shipped 90,786 tons in the month (83,166) and 533,862 tons in the seven months (453,573). July exports jumped to 92,063 tons (76,095), making the seven-month total almost 25% larger than last year at 550,353 tons compared to 441,759.

Industry INTELLIGENCE

Technical Data

Plasticizer ECP 27

ECP 27, a modified epoxidized oil, is an efficient plasticizer for nitrile rubber and is resistant to extraction from nitrile rubber compounds by petroleum solvents. On immersion in such solvents, the swelling of rubbers plasticized with ECP 27 is greater than in the case of comparable compounds plasticized with tritolyl phosphate (TTP) or di-2-ethylhexyl phthalate (DOP). This greater swelling can, however, be attributed to the fact that leaching out of the plasticizer occurs with TTP and DOP, whereas ECP 27 is not leached out to any significant extent. When allowance is made for this difference it is found that the true solvent absorption is similar in each case. After the solvent has dried out of the rubber, compounds containing ECP 27 show good retention of their original properties as the plasticizer has not been removed.

ECP 27 has been compared with TTP and DOP in standard nitrile rubber compounds based on (a) Butakon A.3051 (30% acrylonitrile), and (b) Butakon A.4051 (40% acrylonitrile), the plasticizers being used in a proportion of 15 phr. Results of vulcanization tests are reported in Advance Technical Information Sheet 1021a, issued by A. Boake, Roberts and Co. Ltd., Abrac Works, London, E.15. The plasticizers have a retarding effect on curing of the nitrile rubbers, optimum cure being 40–60 minutes at 153°C. compared with 25 minutes for similar compounds without a plasticizer. ECP 27 has a greater lowering effect on the modulus of the rubber than either TTP or DOP, and it is intermediate between TTP and DOP in its effect on low-temperature properties. The characteristics of ECP 27 make it of interest for the manufacture of petroleum hose, gaskets, etc., based on nitrile rubber. ECP 27 is also compatible with PVC and is therefore a promising plasticizer for blends of nitrile rubber and PVC which are gaining in popularity for electric cable sheathing, conveyor belts and other applications.

Butyl Rubber for Collapsible Food Containers

The exceptional resistance of butyl rubber to animal and vegetable fats and oils makes this type of rubber applicable for collapsible containers for such materials. A recipe for a compound based on Polysar Butyl 402 which should be suitable for this application is given in Polysar Technical Report No. 8:5A, by Z. J. Dorko, distributed in the UK by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4. Polysar Butyl 402 is used to obtain a fast rate of cure and non-staining and non-discolouring properties. To prevent blooming, the mix contains only 1 phr of sulphur and 2 phr of tetramethyl thiuram disulphide. A good state of cure is obtained after 10 minutes at 330°F. in a press or 2½ hours in air at 255°F. Data for the properties of the vulcanizate show a low modulus, so that the container would have sufficient flexibility to be folded up when empty, and a swelling of only 8% volume increase when immersed in ground-nut (peanut) oil, indicating the suitability of the container for vegetable and animal oils and fats.

Plasticizer for PVC

Di-iso-octyl iso-phthalate, a plasticizer for PVC, is very similar in most of its properties to the better-known material, di-iso-octyl ortho-phthalate (DIOP). The two plasticizers have been compared in a PVC compound containing 60 parts of plasticizer per 100 of PVC, the test results being reported in Advance Technical Information Sheet 1022 issued by A. Boake, Roberts and Co. Ltd., Abrac Works, London, E.15.

The test results show that di-iso-octyl iso-phthalate has the advantages over DIOP of (a) significantly lower volatility and (b) much reduced tendency to mar surfaces. For the marring test, specimens of the plasticized PVC compounds were placed in contact with an alkyd-modified nitrocellulose finish on a steel panel and a constant pressure of approximately 1 psi was applied for one day. The assembly was maintained at 45°C. Data are given also for the following properties of the plasticized PVC compounds: Tensile strength, modulus, elongation at break, cold flex temperature, volume resistivity, and loss in weight after extraction by solvents, namely water, 1% soap solution, 1% "Tide" solution and di-iso-butylene.

Machines, Materials and Equipment

Mould Release Spray

A new aerosol pack mould release spray is now available from Kingsley and Keith Ltd. This produce, Victalease P, contains low molecular weight AC polythene as the lubricating agent and has been designed for use with thermoplastic and thermosetting resins and for rubber compounds.

Victalease P is inert and quick drying. It wets surfaces readily and forms a parting film which increases plastic flow and prevents sticking. In moulding applications Victalease P is stated to reduce sticking and rejects and to assure good surface finish. It does not interfere with paintability. Results with injection moulding of polythene indicate that it does not cause surface cracking.

In casting and potting work effective mould release and parting are obtained whilst curing remains unaffected. A smooth finish is obtained and surface strains and striations in the cast part are reduced.

Other applications in which the special properties of Victalease P may be used include the laminating and fabricating of decorative and industrial reinforced plastic materials and for powder metallurgy and other metal fabricating applications.

Publications Received

Williams (Hounslow) Ltd.

A leaflet, 'What's New from Williams?' describes the non-toxic colours for polythene, pollene colours for polystyrene, colouring for polymethyl methacrylate moulding powders (Diakon), master batch colours for high-density polythene, and esterin colours for polyester resins, manufactured by Williams (Hounslow) Ltd., 209-213 Hanworth Road, Hounslow, Middlesex.

'Redux' Bonding in the F-27

'Technical Notes 198,' June, issued by the Technical Service Department of Ciba (ARL) Ltd., Duxford, Cambridge, deals with the use of 'Redux' bonding in the new F-27 transport, built by the aircraft division of the Fairchild Engine and Airplane Corporation in the US. Approximately 400 major component assemblies for the new aircraft were bonded with 'Redux,' a Ciba product. The adhesive primarily used was 'Redux' liquid 775 and 'Redux' powder 775.

Araldite Epoxy Resin Adhesives

A booklet—'How to Use Araldite Epoxy Resin Adhesives'—has been issued by Ciba (ARL) Ltd., Duxford, Cambridge. It includes a chart which specifies certain types and grades of adhesive for use with specific materials ranging from concrete to silver, and it gives advice as to the pre-treatment of these materials and the most effective methods of making joints.

'Araldite' is not only an adhesive, the booklet states, but it is also used for casting high grade solid insulation, for impregnating, potting and sealing electrical windings and components, for producing glass fibre laminates, for producing patterns, models, jigs and tools, as a filler for sheet metal work, and as a protective coating for wood, metal and ceramic surfaces.

The Institution of the Rubber Industry London

Founded 1921

To foster scientific and technical advancement and to disseminate the results

the Institution today

The centre of a great fraternity of rubber manufacturers, scientists, technologists, research establishments, executives and students from many countries.

main objects

To promote the profession and practice of Rubber Technology.

To maintain Diplomas.

To arrange meetings, the reading of papers and lectures.

To encourage original work and research.

publications

The Transactions I.R.I. (bi-monthly).

Reports on the Progress of Rubber Technology (annually).

Proceedings of Rubber Technology Conferences, London.

Invitation to Membership

Extended to all engaged or interested in the rubber and its allied industries.

Full particulars may be obtained from

THE REGISTRAR

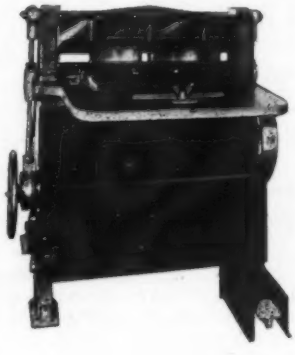
Institution of the Rubber Industry

4 KENSINGTON PALACE GARDENS
LONDON, W.8

CUTTING AND PUNCHING MACHINERY AND TOOLS

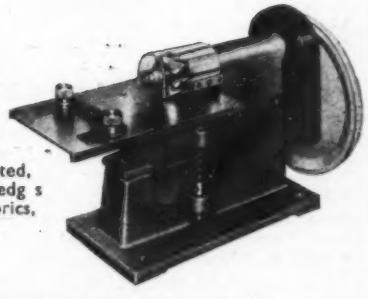
for Rubber, Sponge and Foam Rubber, Plastics, etc.

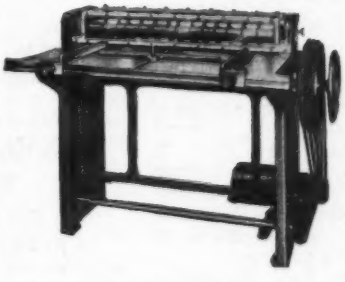
Model No. 1
HAND SHEAR CUTTING MACHINE
30", 43", 54" and 60" Length of cut.
Other Models up to 114" length of cut.



Model No. 27
POWER GUILLOTINE
Rapid cutting of sheets and strips, also Extruded Material to size.
Sizes 20" and 30".

Model No. 43
ROTARY PINKING MACHINE
(Power Operation)
For cutting serrated, scalloped or fancy edg s in rubberised f.brics, etc.





Model No. 125R
ROTARY CUTTING MACHINE
Power Operation, for Cutting Plastic and Rubber Tiles, Floor Strips, etc.
Sizes 25½", 32", 38", 52" and 72" widths.

T. KENDELL & SONS LTD.

Established 1840

French Place, Shoreditch, London, E.1, England

MANY OTHER MACHINES AND TOOLS FOR YOUR TRADE

NEW COMPANIES

London Handle Co. Ltd. (627,043).—April 29. Capital: £3,000 in £1 shares. To carry on the business of manufacturers, producers and moulders of, and dealers in, plastics and plastic materials, etc. The directors are: Henry G. Plowman (permanent), Rosina S. Plowman and Cissie E. Plowman, all of Weir House, Court Road, Maidenhead, Berks. Regd. office: 53 Windsor Road, Slough, Bucks.

Gay Flowers Ltd. (627,532).—May 6. Capital: £20,000 in £1 shares. To carry on the business of artificial flower merchants, importers and exporters of, and dealers in, moulded plastic flowers, etc. The directors are: James M. Alexander, Sandhoe Hall, Sandhoe, Hexham; Abner J. Siris, Joshua A. Rothstein and Isidore Abrams. Solicitors: Cardew-Smith and Ross, 27 Ely Place, London, E.C.1.

J. B. Ranson and Co. Ltd. (627,432).—May 5. Capital: £100 in £1 shares. To carry on the business of retailers and/or wholesalers of all kinds of fancy goods, whether made of wool, cloth, leather, plastic, etc. The directors are: Julia B. Ranson, 18 Grove Road, Southend-on-Sea; Annie Rutter, 7 Commercial Road, Westcliff-on-Sea. Regd. office: 94 London Road, Southend-on-Sea, Essex.

Fancigoods Welders Ltd. (627,423).—May 5. Capital: £1,000 in £1 shares. To carry on the business of manufacture of, and dealers in, leather, hides, skins, cloths, artificial leather, leatherette, rubber, waterproof materials, synthetic products and goods made therefrom; welders, and in particular high frequency welders, electro, chromium, nickel and metal platers, etc. The directors are: Myer Shenderey, 9 Edgwarebury Gardens, Edgware, Middlesex, belt manufacturer and director of Shenderey Ltd., and Charmfit Foundations Ltd.; Leslie Caplin and Mrs. Myra Caplin, both of 75 Harrowes Meade, Edgware. Regd. office: 111 Moorgate, London, E.C.2.

Willence Trading Co. Ltd. (627,545).—May 6. Capital: £100 in £1 shares. To carry on the business of sales organisers, manufacturers, moulders, manipulators, and shapers of all kinds of metal, plastic, concrete, etc. The directors are: Peter T. Fiddes Wilby, Pie-Bear Cottage, Portesbury Road, Camberley, Surrey; Donald D. E. Sillence, 1 Red Lane, Claygate, Surrey. Regd. office: 40 The Parade, Claygate, Surrey.

Allied Insulators Ltd. (627,608).—May 7. Capital: £100 in 5s. shares. To acquire for the purpose of amalgamation (1) the whole of any part of the issued share capitals of Bullers Ltd., and (2) the whole or any part of the assets and undertaking or the issued share capital of Taylor Tunnicliff (Electrical Industries) Ltd.; and to carry on the business of manufacturers of, and dealers in, insulators of all kinds whether made of pottery, porcelain, plasitcs, glass, rubber or any other substance, etc. Regd. office: Leek Road, Milton, Stoke-on-Trent.

Tretol-Serviced Ltd. (627,594).—May 6. Capital: £9,000 in 8100 'A' and 900 'B' shares of £1 each. To carry on the business of manufacturers of, and dealers in, all types of bituminous rubber compounds and elements thereof, etc. The directors are: Sally Trisk, Hedwig Wolff, David A. Jacobs and John Hurst. Regd. office: Tretol House, The Hyde, London, N.W.9.

Reinforced Plastic Engineering (Leyton) Ltd. (627,651).—May 7. Capital: £100 in £1 shares. To carry on the business of manufacturers of, and dealers in, insulating and plastic substances and materials, etc. The directors are: William Andrews, 315 Church Road, London, E.10; Louise E. Evans, 56 Warrier Gardens, Battersea Park Road, London, S.W.1 Regd. offices: 315 Church Road, Leyton, E.10.

R. and B. Plastics Engineers Ltd. (627,802).—May 8. Capital: £100 in £1 shares. To carry on the business of manufacturers, servicers and repairers of, and dealers in machinery appertaining to the plastics industry, etc. The directors are: Kenneth J. Rowles, 47, Falconwood Road, Addington, Surrey; Graham D. Batten, 58 Wentworth Way, Sanderstead, Surrey, directors of Dykehouse International Co. (UK) Ltd. Regd. office: 118 Old Broad Street, London, E.C.2.

Future Events

Plastics Institute

Western Section. — Wednesday September 16 at T. H. and J. Daniels Ltd., Stroud, Glos., at 7 p.m. Film evening.

Society of Chemical Industry

Plastics and Polymer Group.—Wednesday September 23 at the Chemistry Lecture Theatre, Birkbeck College, Malet Street, London, W.C.1, at 6.30 p.m. 'Vinyl Graft Copolymers,' by Dr P. Weiss (General Motors Corporation, USA). Joint meeting with Birkbeck College.

Solution to RJIP Crossword

(See page 178 this issue)

ACROSS.—8, Clone. 9, Pigment. 10, Retarder. 11, Clay. 13, Rinse. 15, Revenge. 16, Conduit. 19, Nerve. 21, Pipe. 22, Selenium. 26, Emerald. 27, Amine.

DOWN.—1, Scar. 2, Cotton. 3, Tear. 4, Appear. 5, Egg. 6, Teflon. 7, Ethylene. 12, Oven. 13, Recapped. 14, Equi. 17, Nipped. 18, Treads. 20, Raisin. 23, Elan. 24, Meek. 25, Tar.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

STABILENE (769,498) For sheet materials made of glass fibres; and paper and film; all for use in writing, drawing, scribing and tracing. By Keuffel and Esser Co., Adams and Third Streets, City of Hoboken, New Jersey. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. To be associated with No. 769,497 (4220, 544). (Class 16; May 27 1959.)

MOPLEN (776,694) For cartons and boxes, all included in Class 16, printed matter, bookbinding materials, lithographs, photographic prints, photographs, writing cases, writing erasers, writing nibs, writing implements, drawing boards, drawing rulers, drawing squares, drawing compasses, drawing instruments, pen and pencil holders, penknives, packaging material, adhesives (stationery), paint brushes, plastic substances for modelling, parts included in Class 16 of typewriters, holders for index cards, paper racks, label holders, card indexes, instructional and teaching material (other than apparatus), ordinary playing cards, (printers') type and cliches (stereotype), all being goods made of polypropylene resin plastics. By Montecatini Societa Generale Per L'Industria Mineraria e Chimica, 18 Via Filippo Turati, Milan, Italy. Address for service is c/o Eric Potter and Clarkson, 317 High Holborn, London, W.C.1. To be associated with No. 776,686 (4191, 1127) and others. (Class 16; May 27 1959.)

POLYSTANTOR (784,780) For fittings of common metal for pipes made of plastics. By Yorkshire Imperial Metals Ltd., Haigh Park Road, Stourton, Leeds, Yorkshire. To be associated with No. 466,814 (2511, 1110) and another. (Class 6; June 3 1959.)

STRATOFLEX (773,449) For hose-piping and hose-pipes (sold complete) none made wholly or principally of metal. By Stratoflex Inc., 220 Roberts Cutoff, Fort Worth, Texas. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5-9 Quality Court, Chancery Lane, London, W.C.2. To be associated with No. B615,441 (3314, 376) and another. (Class 17; June 3 1959.)

TRIPACA (780,656) For textile piece goods made principally of fibres of triacetate plastics. By Arthur Tate (Bradford) Ltd., Airevale Works, Pollard Lane, Newlay, Leeds 13, Yorkshire. (Class 24; June 3 1959.)

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on July 8 1959

British Celanese Ltd. Sheets of thermoplastic material having a porous or cellular structure. 816,136.

Bataafsche Petroleum Maatschappij N.V., De. Process for treating alkylene polymers. 816,292.

Monsanto Chemical Co. Process for the production of polymers. 816,110.

G. M. Pfaff A.G. Seam-welding of thermoplastic synthetic sheet material. 815,989.

Revertex Ltd. Vulcanization of aqueous dispersions of rubber. 816,230.

Midland Silicones Ltd. Electric conductors coated with modified alkyd resin compositions. 816,072.

American Cyanamid Co. Preparation of acrylonitrile. 816,249.

Hercules Powder Co. Emulsion polymerization of unsaturated compounds. 816,252.

Farbenfabriken Bayer A.G. Process for the production of transparent rubber articles from matural latex. 816,018.

United States Rubber Co. Polymerization of alkyd resin systems. 816,019.

Midland Silicones Ltd. Organosilicon polymers. 816,278.

R. H. Windsor Ltd. Injection-moulding machines. 816,279.

Chemische Werke Albert, and Sigmaringen, F. F. Von Hohenzollern-(trading as Fürstlich Hohenzollernsche Hüttenverwaltung). Production of compound bearings having a synthetic resin layer. 816,312.

Open to public inspection on July 15 1959

Telegraph Construction and Maintenance Co. Ltd. Trapped rubber joints, between electric cables and surrounding enclosures. 816,472.

National Research Development Corporation. Polyamide membranes. 816,572.

Dunlop Rubber Co. Ltd. Expanded resinous materials. 816,502.

Wacker-Chemie G.m.b.H. Process for the manufacture of water-insoluble nitrogenous polymerization products. 816,575.

Farbenfabriken Bayer A.G. Coating casein films. 816,704.

Montecatini Soc. Generale Per L'Industria Mineraria e Chimica. Process for the polymerization in suspension of vinyl monomers, using graft polymers as dispersing agents. 816,579.

Rubber Journal and International Plastics CLASSIFIED ADVERTISEMENTS

APPOINTMENTS VACANT

6d. a word, Minimum 10/- Box 2/-

CHEMIST required with experience in compounding natural and synthetics and of process control. Several years' experience and A.I.R.I. or equivalent preferred. Applications marked confidential should give full details of education and experience.—Box 161. (161)

CHEMIST required for development laboratory. B.Sc. or H.N.C. level, with some knowledge of rubber desirable, but not essential. Apply giving full details to:—Personnel Manager, The Rubber Regenerating Co. Ltd., First Avenue, Trafford Park, Manchester, 17. (174)

RUBBER IMPROVEMENT LIMITED require a works manager who must be fully qualified and experienced in the rubber and plastics industries to work directly under the general manager at their Wellingborough factory. This is a top-level appointment for a man of high calibre, possessing appropriate qualifications, including experience of modern production methods and handling of labour. Non-contributory pension and life insurance schemes operate.—Write in complete confidence giving fullest commercial and personal particulars and salary required to the Deputy Managing Director, Rilex House, Chandos Street, London, W.1. (181)

DEVELOPMENT ENGINEER

The North British Rubber Co., affiliated to the United States Rubber Co., require the services of a development engineer.

Candidates, aged 30-45 years, should possess B.Sc.(Eng.) or A.M.I.Mech.E. A knowledge of conveyors and belting, and experience in field operations is desirable. The ability to collaborate with technical specialists in other fields and be receptive to new ideas is essential.

Salary will be competitive and in line with the responsibilities of the appointment. Company benefits include a contributory superannuation scheme and free life assurance.

Applications, giving full details of qualifications, experience and age, should be addressed to J. McCartney, Industrial Relations Manager, The North British Rubber Co. Ltd., Heathhall Factory, Dumfries. (190)

APPOINTMENTS VACANT

DUNLOP RUBBER CO. LTD., MANCHESTER

A small number of vacancies exist for

SENIOR RUBBER TECHNOLOGISTS

to fill key positions in the Technical Department.

Special training for executive responsibility will be provided where necessary, but some initial administrative ability is essential.

Opportunities exist for both Development and Process Control Engineers and Chemists.

Applications are invited from qualified and enthusiastic young men in the 28-40 age group with A.I.R.I. or B.Sc., and at least five years' experience in the General Rubber Goods field.

Particular experience in either Compounding, Mill Process Control, General Quality Control, Proofing or Product Development would be an advantage.

Salaries available are commensurate with the experience demanded and responsibility involved, and prospects of promotion along clearly defined lines are exceptionally good.

Applications should be addressed to:—

Technical Personnel Officer, Dunlop Rubber Co. Ltd. (G.R.G. Division), Cambridge Street, Manchester, 1. (178)

RUBBER LATEX LTD., Harling Road, Manchester, 22, require a laboratory assistant. Applicants should have reached at least O.N.C. level and have previous laboratory experience. Age between 21 and 30 years. The position is permanent and a pension scheme is in operation. (180)

APPOINTMENTS VACANT
(continued)

RUBBER TECHNOLOGIST

A large and rapidly expanding company of international repute seeks to engage an Industrial Rubber Technologist for their modern factory in the North of England. Duties will include the investigation and development of rubber and allied products.

Applicants should be A.I.R.I. or hold equivalent qualification, preferably with some experience of Textiles and Plastics. The selected candidate will have at his disposal the resources of a modern and well-equipped Laboratory and Technical Library.

The company operates a generous pension and life assurance scheme and there are excellent canteen and recreational facilities. Please write in strictest confidence giving full details of age, qualifications, past experience and present appointment to Box 167.
(167)

TECHNOLOGIST required for development laboratory. Candidates must have ability and interest to conduct technological and fundamental investigations. H.N.C. (with rubber experience). A.I.R.I. qualification preferred, L.I.R.I. with suitable experience would be considered. Apply giving full details to:—Personnel Manager, The Rubber Regenerating Co. Ltd., First Avenue, Trafford Park, Manchester, 17. (175)

YOUNG graduate for adhesive and plastic research. An interesting appointment becomes available with a growing organization of national reputation for a young graduate who will work on research and development problems in a wide field of chemical products. Previous industrial experience is not essential, but some knowledge of adhesives and plastics would be an advantage. We seek a man with drive and initiative, able to appreciate the excellent prospects in a rapidly expanding organization. The company works a five-day week, a pension scheme is available and an excellent salary will, of course, be paid. Applications in full detail should be addressed to:—The Managing Director, Evode Limited, Common Road, Stafford. Marked private and confidential. (171)

AN ESTIMATOR

is required by Dexine Rubber Co., Ltd. Knowledge of Rubber Processing not necessary but Engineering experience would be an advantage. Excellent prospects of advancement for keen and intelligent man. Pension scheme, five-day week, staff canteen. Apply in writing to:

Personnel Officer,
Coldwall Street, Rochdale.
(184)

APPOINTMENTS VACANT
(continued)

RUBBER technologist required with an old-established company. Experienced in compounding natural and synthetics and process control. Good salary depending on experience. The position is a responsible one and is a first opportunity in an expanding organization.—Apply by letter only to the Chief Chemist, C. E. Heinke and Co. Ltd., 9 Grange Road, London, S.E.1. (188)

MISCELLANEOUS
6d. a word, Minimum 12/6 Box 2/-

'COTSWOLD' dipping machines and circulating tanks for latex and PVC. New catalogues now available on request.—Lionel Hook and Sons, Ebley, Stroud, Glos. Tel.: Stonehouse 614/5. (30)

DESIGN capacity available for all types of rubber moulds. Send component-drawing or sketch for prompt estimate.—G.I.B. Drawing Office, 50 Winchester Road, Kenton, Middlesex. WORdsworth 7972. (119)

MANUFACTURERS of roughing machines for rubber thinning, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy, Ltd., Imperial Works, Menston, Nr. Leeds. (2308)

ARTICLES FOR SALE (SECONDHAND)
6d. a word, Minimum 12/6 Box 2/-

FOR sale. 75 h.p. 415/3/50, 480 r.p.m. slip ring motor on bedplate with brake and automatic starter, guaranteed.—Box 185. (185)

UNIVERSAL tensile testing machine, hydraulically operated, self-indicating, with 3 chart ranges 1,200lb. x 5lb., 600lb. x 2lb., 240lb. x 1lb. Complete with wedge grips. Condition as new.—Box 179. (179)

450-TON 5-daylight press by John Shaw, 24in. ram; platens 54in. square. 450-ton 8-daylight press by Francis Shaw, 24in. rams; platens 36in. x 30in. 350-ton down-stroke prefilling press by Bradley and Turton; platens 30in. x 36in. 4½in. strainer extruder by Iddon with 30 h.p. B.T.H. motor drive.—Reed Brothers (Engineering) Ltd., Replant Works, Woolwich Industrial Estate, London, S.E.18. Telephone: Woolwich 7611/6. (182)

AGENCIES and REPRESENTATIVES
6d. a word, Minimum 12/6 Box 2/-

MERCHANTS dealing in natural, synthetic and reclaimed rubber require sales representatives for all areas, calling regularly on rubber manufacturers. Freelance representatives not objected to, providing other lines are non-competing.—Please write to Box 187. (187)

MANUFACTURERS desiring representation in Northern Ireland are invited to contact long-established Belfast factors and agents with connections among industrial, engineering, transport and commercial concerns.—Box 189. (189)

WITCO CHEMICAL CO. LTD. require experienced representative to cover rubber trade Greater London area and South-West England. Some technical knowledge desirable. Applicants must be resident London area. Excellent prospects for right man. Apply by letter.—Managing Director, Bush House, W.C.2. (186)

APPOINTMENTS WANTED
6d. a word, Minimum 10/- Box 2/-

EXECUTIVE many years' experience in all branches of the rubber industry, seeks responsible position. Former chief chemist.—Box 188. (188)